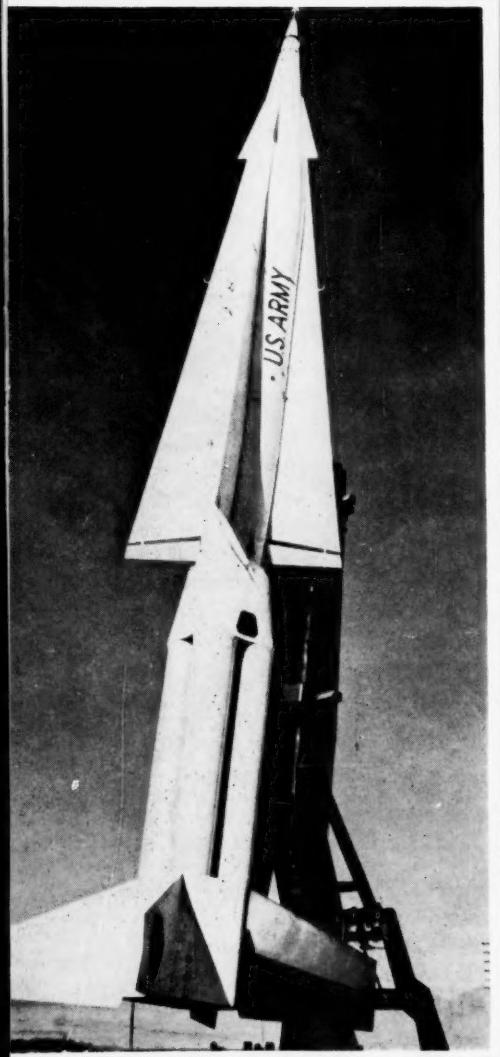


Chemical Week

May 25, 1957

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◀ **CCDA appraises rocket outlook, finds plenty of opportunity and a big problem p. 23**

Take a close look at Netherlands if you're seeking a base for doing business in Europe p. 35

High-energy fuels are sparking hard-driving boron research. Now: new diborane process . . . p. 48

Kilowatt competition: U. S. and British reactors vie for favor of world's power-hungry areas . p. 58

Butane aerosol propellents are publicity-shy, but they'll power 45-50 million units in '57 . . p. 92

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Photo courtesy Mohawk Carpet Mills, Inc., Amsterdam, New York

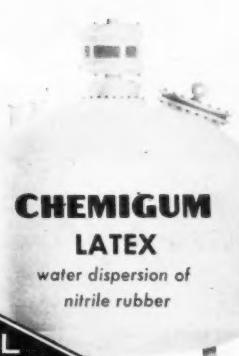
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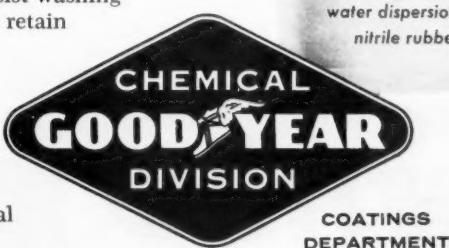
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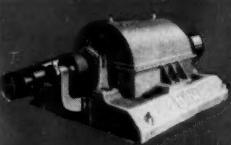


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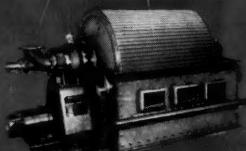
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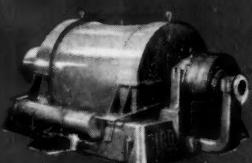
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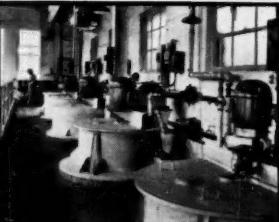
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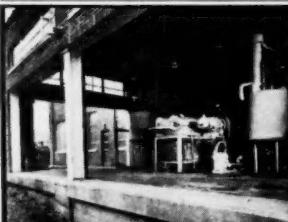
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TOP OF THE WEEK

May 25, 1957

- **Labor union's plan of attack on PRDC's reactor-building program takes shape in AEC hearing** p. 25
- **Ex-Monsanto engineer, accused of revealing trade secrets to rival firm, defends possession and use of documents ..** p. 41
- **Petroleum processors report on instrumentation progress at American Petroleum Institute parley** p. 62
- **Federal statistics-gathering activities will be hit by budget cuts. Most new programs will be affected** p. 72

14 OPINION

16 MEETINGS

19 BUSINESS NEWSLETTER

23 BUSINESS NEWS

23 Chemical management is taking a fresh look at the growing U. S. missile program. Their interest: lively, but cautious.

25 Chemical process man William Holladay takes over supervision of earth-satellite program and development of antimissile systems.

26 There are fresh signs of a revival in phosphate mining and mineral development in South Carolina.

26 Louisville aldermen have approved Reynolds' request for annexation by the city. Here are the details.

26 Du Pont unveils its Hagley Yards redevelopment, scene of the firm's early powder manufacturing operations.

31 WASHINGTON NEWSLETTER

32 CHARTING BUSINESS

35 ADMINISTRATION

Proximity to big European markets plus easy-to-deal-with government draw chemical concerns to Holland.

48 RESEARCH

High-energy fuels development focuses interest on a new diborane process.

50 How to size up the creative researcher is revealed by recent University of Chicago study.

58 PRODUCTION

Nuclear power planners weigh commercial prospects of Calder Hall's and Shippingport's descendants.

69 TECHNOLOGY NEWSLETTER

72 SALES

81 MARKET NEWSLETTER

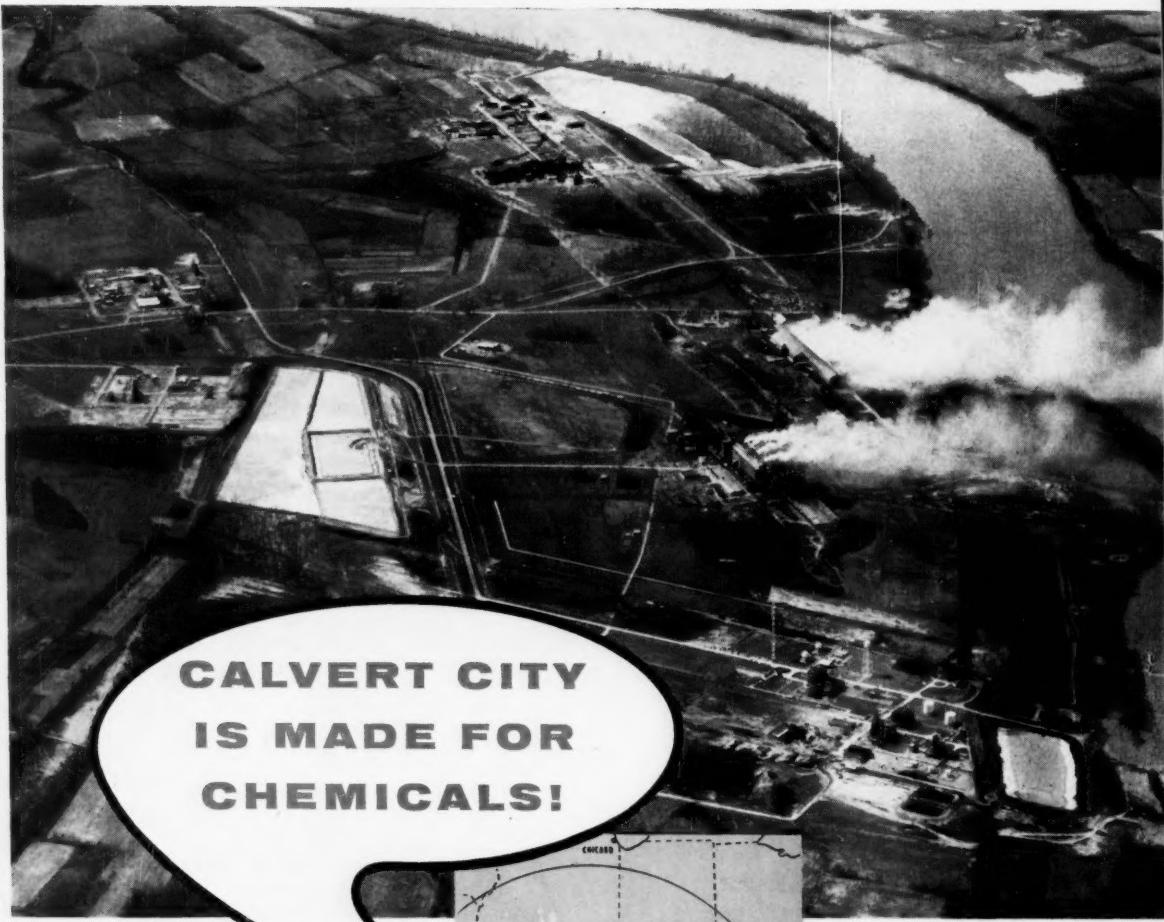
85 MARKETS

Canadian processors could win plenty of uranium business away from U.S. counterparts. Here's what's happening in Canada's newest uranium-boom area.

92 SPECIALTIES

Hydrocarbon propellents for aerosols will be used in 45-50 million units this year. Potential fire hazard has made their use a point of controversy.

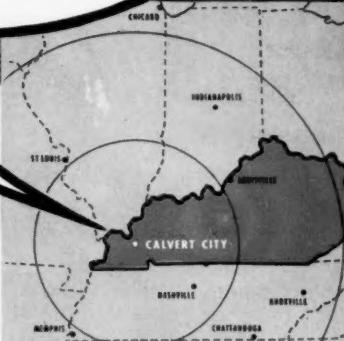
99 Two major makers of water-softening equipment find soft water sells their own brands of soap. Here's how they go after the business.



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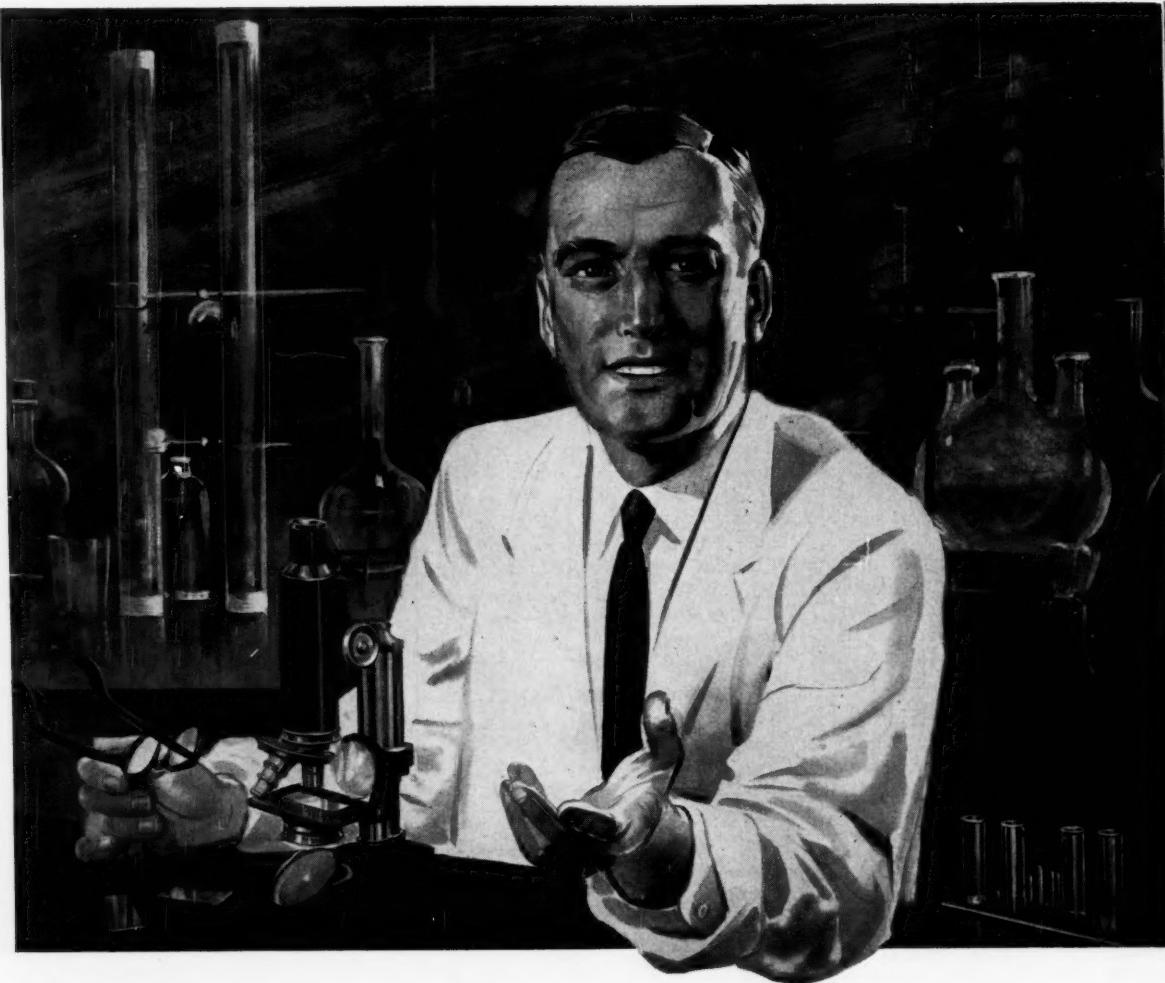
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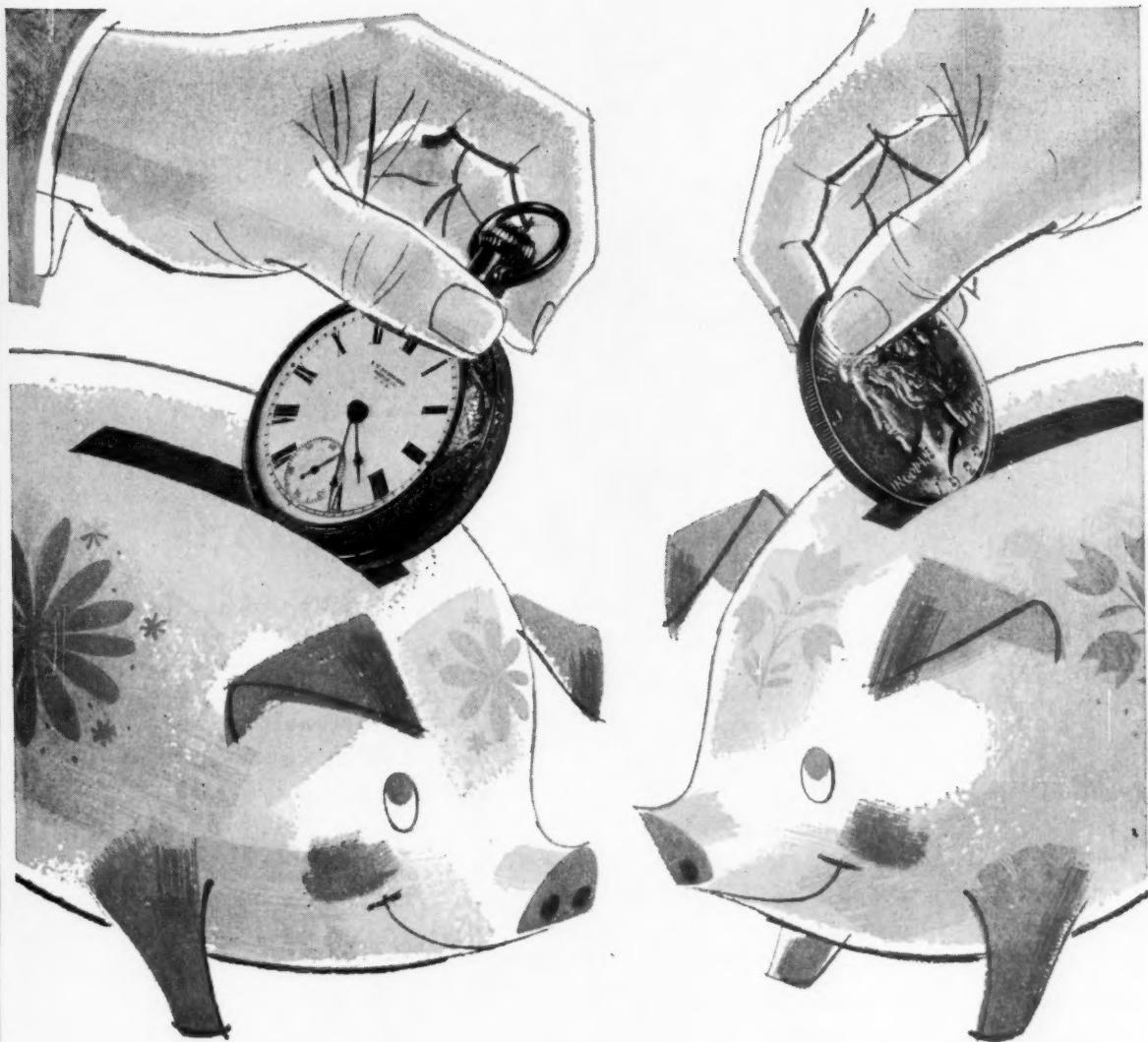
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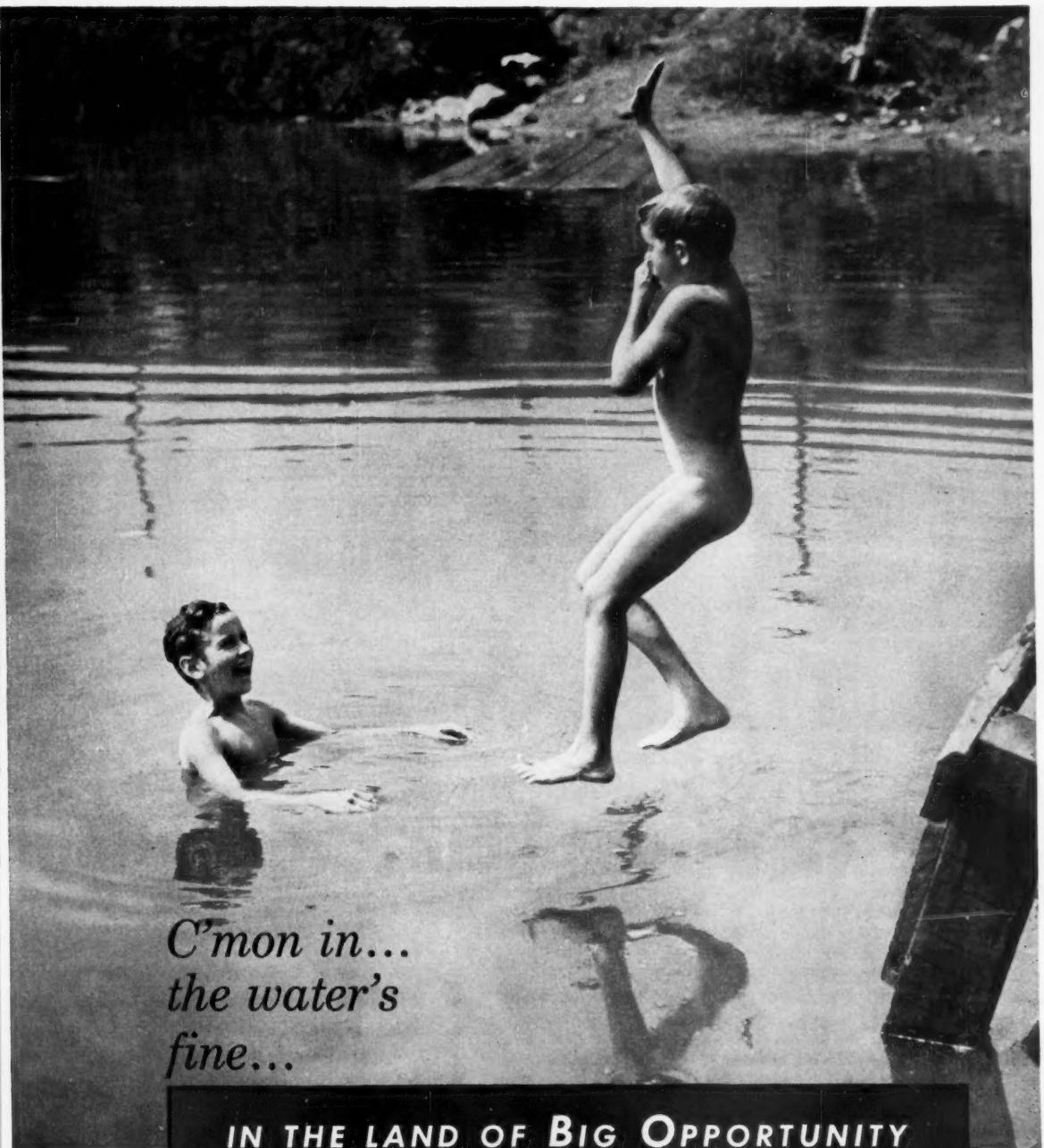
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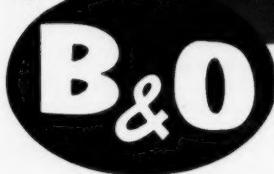
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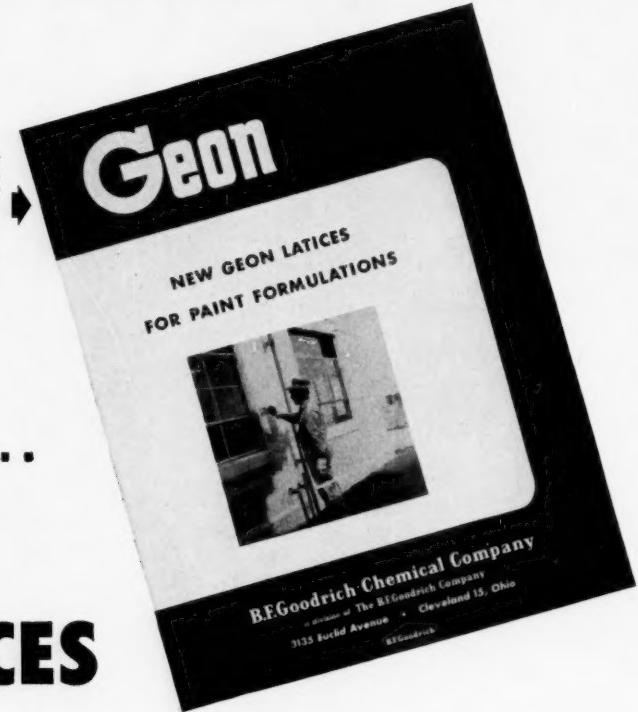
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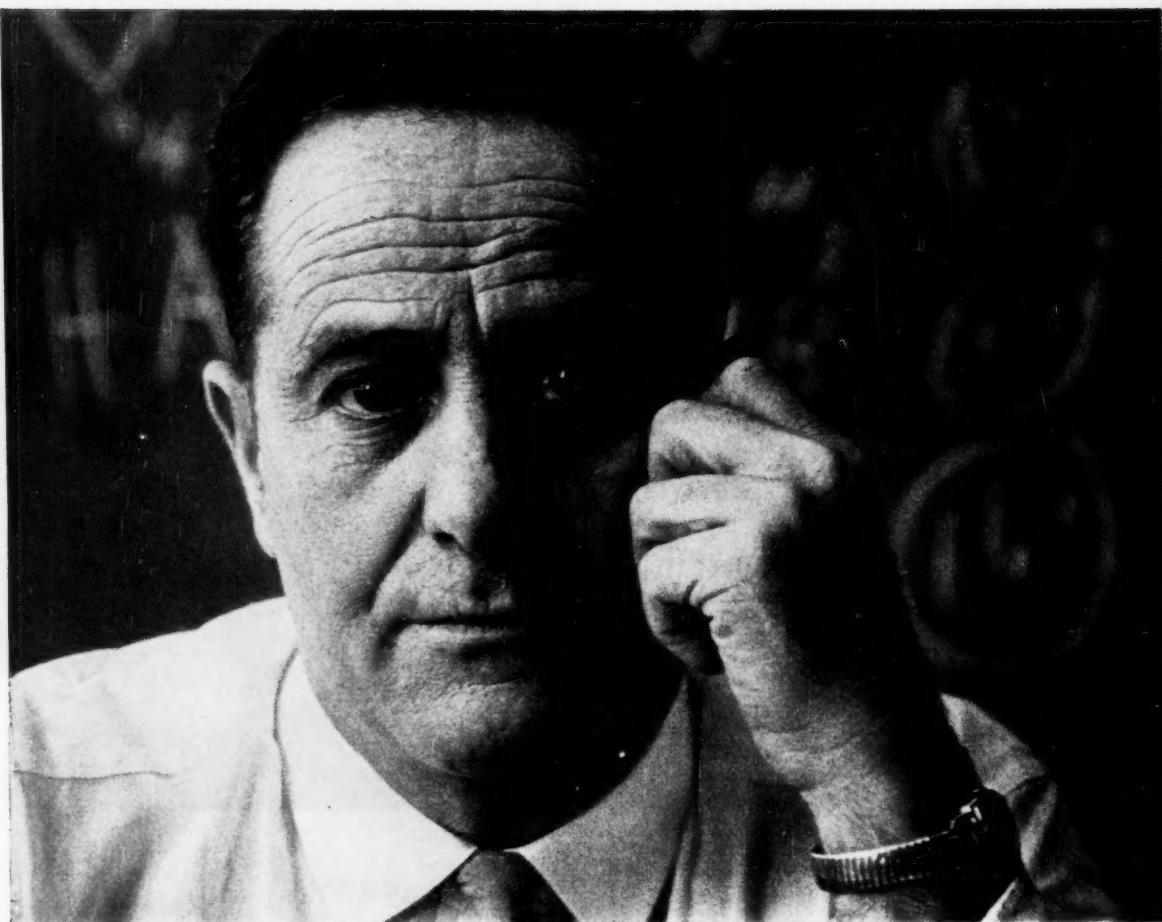
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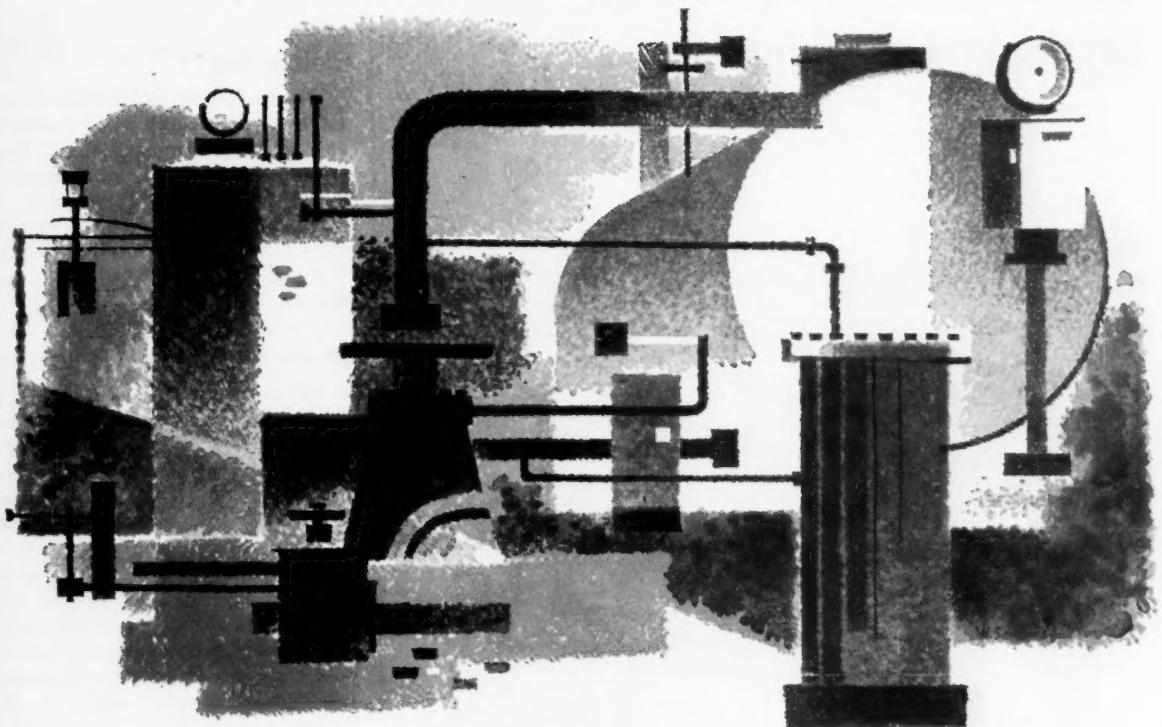
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181	Tetraethylene Glycol Dimethyl Ether $\text{CH}_3(\text{OCH}_2\text{CH}_2)_4\text{CH}_3$ (Dimethoxy Tetraethylene Glycol)
222	Ethylene Glycol Diethyl Ether $\text{C}_2\text{H}_5\text{OCH}_2\text{CH}_2\text{OC}_2\text{H}_5$





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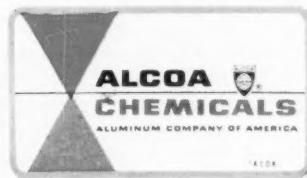
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OPINION

Delete the '2'

TO THE EDITOR: CHEMICAL WEEK (April 6, pp. 36-37) writes K_2MnO_4 and refers to "permanganate." That subscript 2 makes it manganate, I think.

A. E. BROWN
Westfield N.J.

Right. It should have read $KMnO_4$.—ED.

More on Cyanoethylation

TO THE EDITOR: Because we are working for the good of cotton and have done much work on the treatment of cotton with acrylonitrile, we naturally were interested in the article, "Cotton Gets a Tough Coat" (March 16).

We think that you and your readers might be interested in some of the work done here recently in this field. In one study, we have treated cotton with the vapors of acrylonitrile under conditions that cause polymer to be formed in and on the fibers. This process decreases the formation of by-products and gives a new fiber that has unusually good resistance to rot and flat abrasion. Under some conditions, the tensile strength is greatly improved.

In recent work, we have learned also that the manner in which cyanoethylated cotton is washed after the cyanoethylation treatment has great influence on the properties of the products. Improved heat resistance is obtained by the use of a slightly alkaline rinse.

Another finding of practical value is concerned with the effect of certain silicone softeners on abrasion resistance and tear strength. By the proper use of softeners, both of these properties can be greatly improved.

In still another investigation, we

CW welcomes expressions of opinion from readers. The only requirements: that they be pertinent, as brief as possible.

Address all correspondence to:
H. C. E. Johnson, Chemical
Week, 330 W. 42nd St., New
York 36, N.Y.

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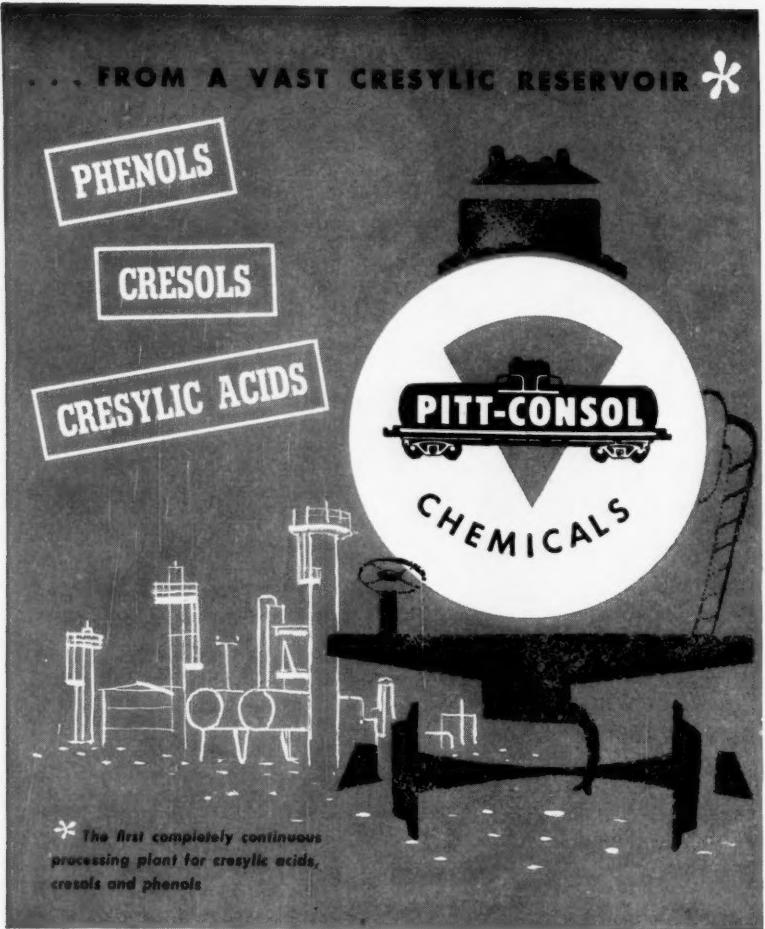


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OPINION

have learned that cotton yarns may be cyanoethylated continuously by applying alkali and acrylonitrile to the yarn and then passing the treated yarn through a hot mercury bath. This method of cyanoethylating cotton not only minimizes the formation of by-products but also gives a yarn having improved properties.

. . . We invite . . . your readers to write us to get further information about our work.

C. H. FISHER

Director, Southern Utilization Research and Development Division
U.S. Dept. of Agriculture
New Orleans, La.

MEETINGS

Chemical Market Research Assn., annual business meeting; symposium: Basic Forces for Change in Chemical Industry; Hotel Plaza, New York, May 27-28.

Synthetic Organic Chemical Manufacturers Assn., outing, Skytop, Pa., May 27-29.

National Assn. of Purchasing Agents, Chemical Industry Buyers' Group meeting, Hotel Marlborough-Blenheim, Atlantic City, May 27-29.

Air Pollution Control Assn., joint program with ASHAE, AICWE, AMS, golden anniversary meeting, Jefferson Hotel, St. Louis, Mo., June 2-6.

Dept. of Industrial and Management Engineering of Columbia University, 8th annual conference on industrial research, Arden House, Harriman, N.Y., June 2-7.

Chemical Institute of Canada, 40th annual conference, University of British Columbia, Vancouver, B.C., June 3-5.

National Society of Professional Engineers; theme: professional development of the young engineer; Statler-Hilton Hotel, Dallas, June 5-8.

National Technical Career Conference and Technical Personnel Recruiting Exposition, Hotel Sherman, Chicago, June 8-12.

American Institute of Chemical Engineers, national meeting, Olympic Hotel, Seattle, June 9-12.

Society of Plastics Engineers; symposium: Plastics for Electronics; Lowell Technological Institute, Lowell, Mass., June 14.

Institute of Paper Chemistry; theme: water-derived problems of the pulp and paper industry; Appleton, Wis., June 16-July 11.

American Society for Engineering Education, 65th annual meeting, Cornell University, Ithaca, June 17-21.



News from National Carbon Company

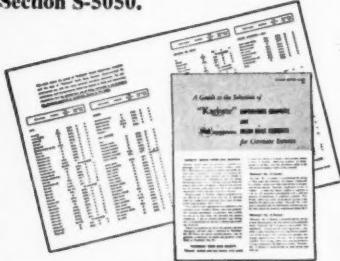
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PROCESS EQUIPMENT BRIEFS

Extensive Corrosion Resistance Table on "KARBATE" Impervious Graphite Now Available

A new guide to selection and use of "Karbate" impervious graphite and "National" resin base cements in over 100 corrosive applications. 4-page booklet contains specific grade recommendations and information on field testing procedures. Request Catalog Section S-5050.

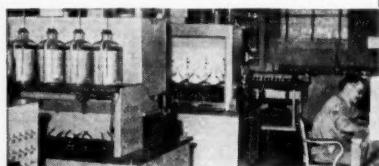


National Carbon Expands Carbon and Graphite Development Program



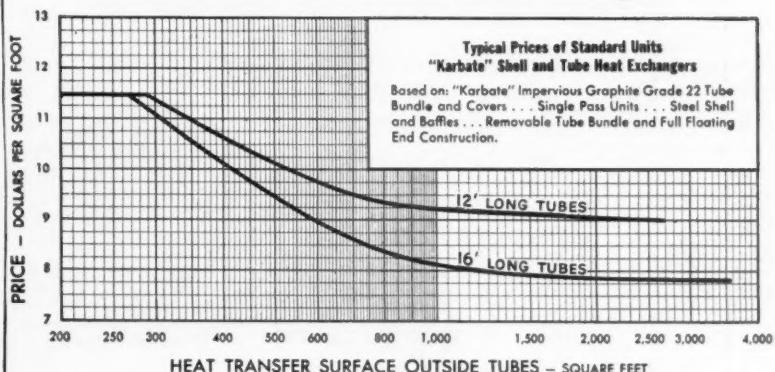
NIAGARA FALLS DEVELOPMENT LABORATORY

Maintaining its leadership in the broadening industrial use of carbon and graphite, National Carbon has expanded product development facilities at Niagara Falls, New York, to supplement new major research activities at Parma, Ohio. A large share of the expansion is devoted to development and evaluation of graphite anode materials for the electrolytic production of chlorine-caustic, chlorates, sodium and magnesium. The test room shown below contains miniature electrolytic diaphragm-type chlorine cells used in laboratory performance tests on "National" graphite anodes.



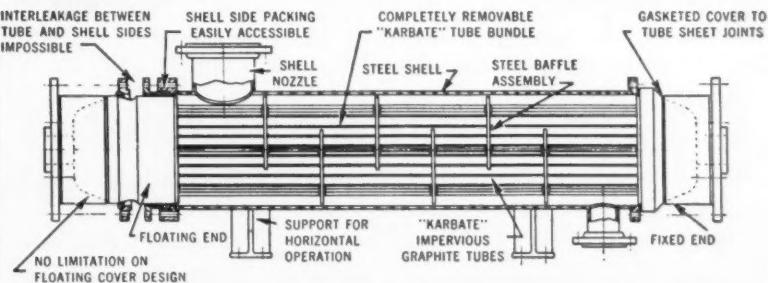
ELECTROLYTIC ANODE TEST ROOM

Quick Reference Chart Covers Prices of "KARBATE" Impervious Graphite Shell and Tube Heat Exchangers

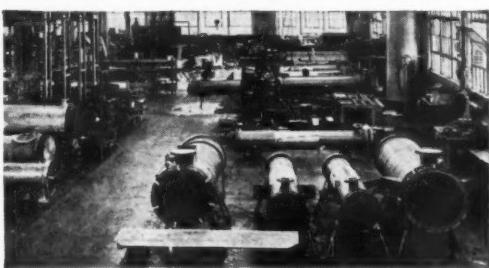


New pricing charts on "Karbate" impervious graphite heat exchangers show their economy for all types of heat transfer involving corrosive fluids. Standard units assembled from stocked components, covering 16 shell sizes from 6" through 45" diameter and containing from 9 to 685 7/8" I.D. impervious graphite tubes in 6, 9, 12, 14

and 16 ft. tube lengths, can be shipped in 3 to 5 weeks. Cut away view below demonstrates how sturdy, durable construction utilizes "Karbate" impervious graphite's corrosion resistance, immunity to thermal shock and freedom from metallic contamination in corrosive service. For price and product data, request Catalog Section S-6800.



View at right shows assembly and test facilities producing "Karbate" shell and tube heat exchangers. Units have "Karbate" impervious graphite tube bundles and covers assembled in shells of steel or materials such as glass or rubber lined steel, "Haveg" phenolic resin, aluminum or impervious graphite.



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Business Newsletter

CHEMICAL WEEK

May 25, 1957

Colgate trimmed about 75 people from its research staff last week, in a pruning operation designed to streamline the department. Colgate feels the department has grown too large during a recent period of rapid expansion. The Jersey City soapmaker, which just last month lost its president, hastens to make two points clear: (1) the firings were not a result of the recent management study done by an outside consulting firm; they were in the research group's plans for several months; (2) the company's research program is not being sacrificed.

Some of those discharged appeared to have been taken by surprise, and the firm admits that termination of work followed closely on notices of discharge. The firm feels that severance pay—roughly a week's pay for each year worked—compensates for the short notice.

Bids are in for the magnesium plant at Painesville, O. The 36-million-lbs./year facility, now government owned, is sought by two firms—Kaiser Aluminum & Chemical Corp., and Wheeler Chemical Corp. (Tulsa, Okla.).

Kaiser, which operated magnesium plants during World War II and the Korean War, offers \$3 million cash upon closing. But Kaiser also stipulates that the government award it a magnesium supply contract, and give the plant to Kaiser for two years. During that time, the company would decide, on its own judgment, whether or not the plant could be operated economically. If not, the deal's off.

Wheeler made two bids: (1) \$500,101 to be paid over a period of 10 years, 20% down with 5% interest on the balance, and principal and interest payments to be made quarterly; (2) same amount on same terms, but, in addition, a maximum of \$2 million to be paid at the rate of $\frac{1}{2}$ ¢/lb. of magnesium metal produced and sold during the 10 years.

The General Services Administration in Chicago has 60 days to consider both companies' bids for the plant, which cost about \$15.5 million to build in 1942. A national-security clause—under which the Dept. of Defense has the right to recover the facility in times of emergency—applies to the plant.

Smith, Kline & French will have its stock listed on New York and Philadelphia exchanges by year's end—or at least, that's the plan of SKF's president, Francis Boyer. The pharmaceutical firm, which had '56 sales of \$104.6 million, now has more than 6,000 stockholders, and seeks the "stature it deserves with the investing public." At present, SKF stock is traded over-the-counter.

Aerosol sales in 1956 set a new record, 320 million units, according to a survey by Chemical Specialties Manufacturers Assn. The

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Business Newsletter

(Continued)

products, valued at \$320 million, total more than 33% above the '55 sales mark, and that does not include food items—e.g., whipped toppings. Leading product was hair sprays, with sales of nearly 80 million units. Insecticides, displaced from the top spot for the first time, racked up sales of 52 million units. Other significant totals: shave lathers, 42 million; room deodorants, 35 million; paints, 22.5 million. Household products took a 272% leap, up to 23 million units.

Glass aerosol use also jumped, to 15 million, from about 10 million in '55. Metal container use was pegged at 328 million; valve use at 357.5 million.

About 80 aerosol fillers took part in the survey; the actual reported count of 293,190,453 units was expanded upon the basis of container and valve information.

Magnolia Petroleum may expand into the petrochemical field.

Plans are still indefinite, but the oil producer has set up a committee to check on the feasibility of petrochemicals manufacture, either by itself or in cooperation with another firm. Any facilities for chemicals that might be built would probably be in the Beaumont, Tex., area, near Magnolia's refinery.

Oil, Chemical & Atomic Workers will lower their wage-increase goals, from all appearances. The union has told its locals in the oil industry to accept the 16¢/hour (6%) wage boost offered by oil management, although just last week it demanded a minimum 27¢/hour (10%) rise. The policy covers OCAW locals at petrochemical plants linked to oil refineries, will likely influence 1957 wage settlements at chemical plants in "oil territory." (See also p. 31, *Washington Newsletter*.)

New anticorruption measures have been adopted by the executive boards of both the OCAW and International Chemical Workers Union (both AFL-CIO). OCAW's plan calls for opening the union's books for inspection by companies, governmental, or other "groups of interested parties." Main proviso: there must be more than one party to each inspection, "so there'll be a witness to everything." ICWU's board adopted the AFL-CIO ethical practice code on cooperation with public agencies, and also tightened up administrative procedures for granting charters to new locals.

OCAW-ICWU merger now appears more remote than ever, despite the fact that ICWU now has a pro merger president, Walter Mitchell. Although Mitchell has invited OCAW to a formal parley on the subject—the first in 15 months—OCAW seems to be stalling about accepting. And last week, Mitchell and his board members adopted a resolution calling for "one strong, militant union of chemical workers," suggesting ICWU is not eager for an alliance with oil workers.

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$$(60 \times \frac{32}{78} = 24.6 \text{ lbs. of sulfur})$$

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$$(70 \times \frac{32}{56} = 40 \text{ lbs. of sulfur})$$

2. Therefore the sulfur in sodium sulfhydrate costs less than the sulfur in sodium sulfide. Sulfur in Na₂S (at prevailing prices) costs about \$.224 a pound.

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3. And because Hooker sodium sulfhydrate contains less water of crystallization, it costs less in freight charges.

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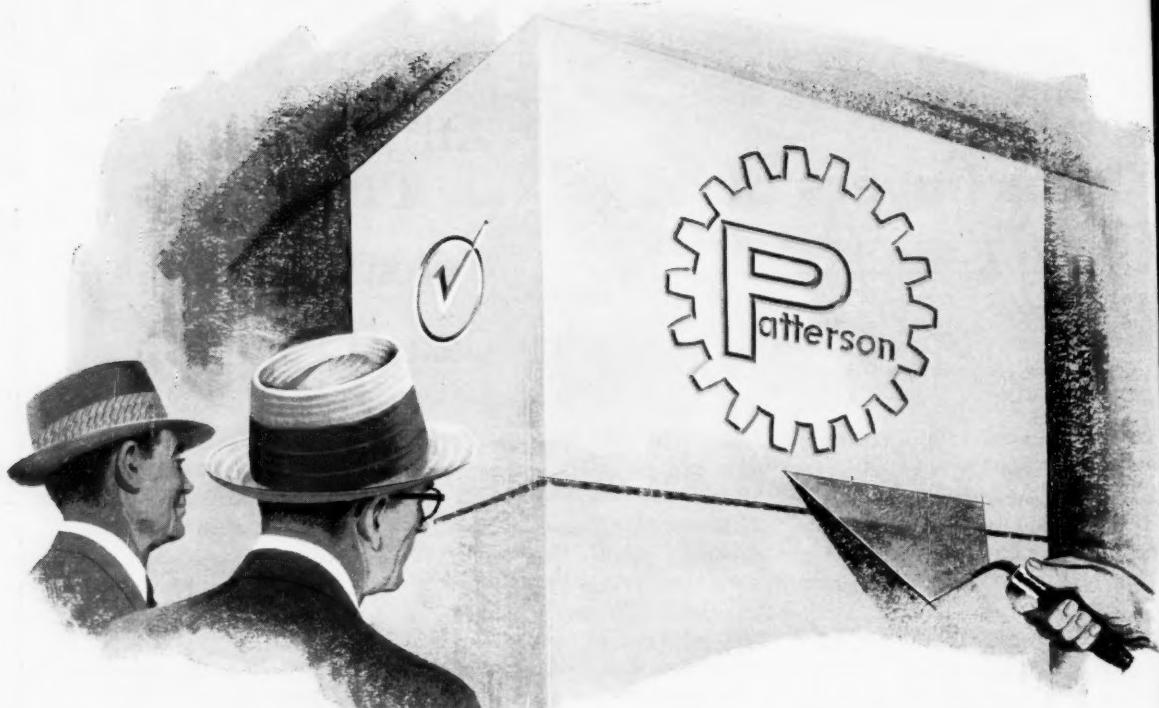
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Chemical Week

May 25, 1957 — Vol. 80, No. 21

Reappraising the Rocket Outlook

For three hot and humid days last week, the sleepy old spa of French Lick, Ind., hummed with rocket-age talk. Sounding this anachronistic note were 121 members* of the Commercial Chemical Development Assn. who were gathered for their spring meeting (theme: what the rocket and missile program means to the chemical industry). Tenor of the meeting's panel discussions was that the U.S. rocket and missile program will keep growing—and so will opportunities for participation by chemical process companies.

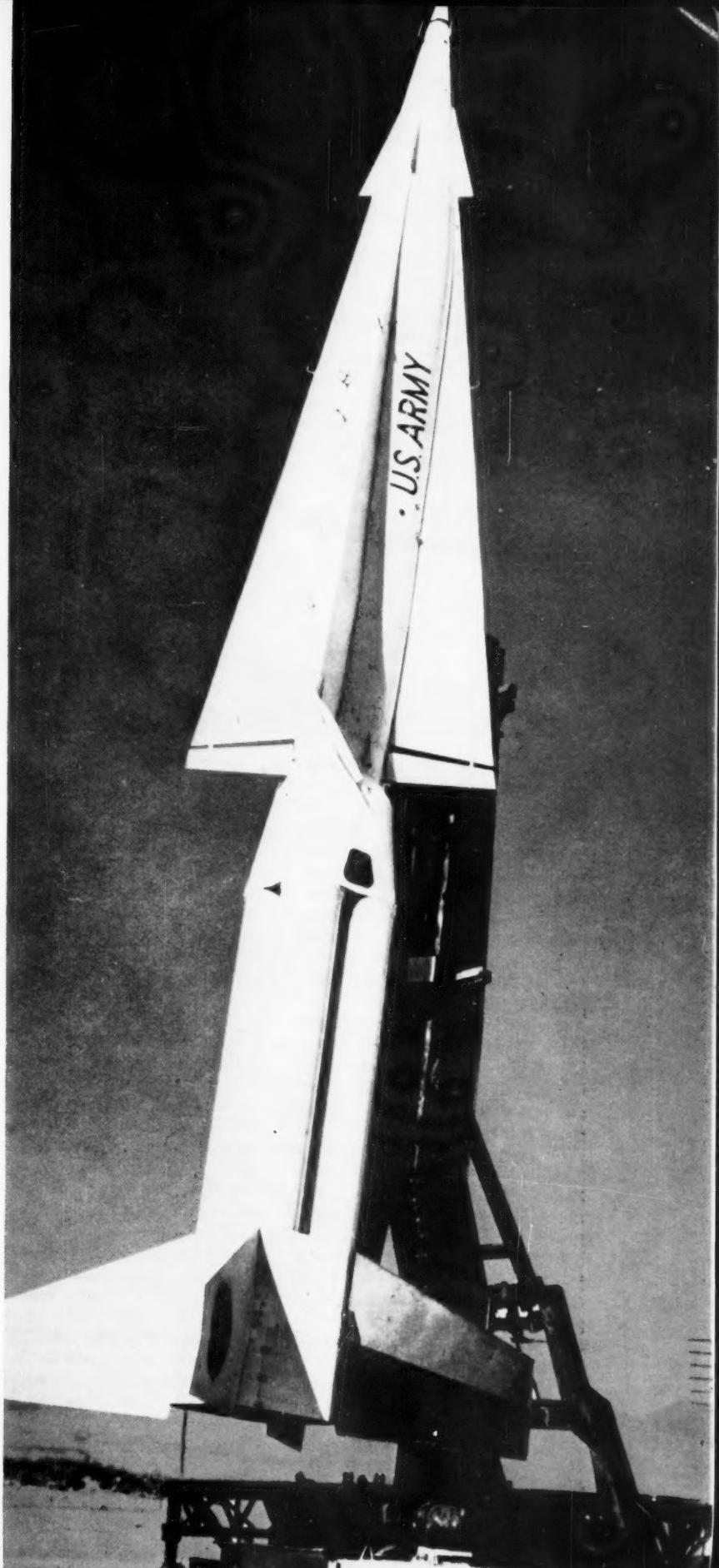
But, from the inevitable undercurrents of opinion, it was obvious that the industry is taking the whole thing cautiously. Reason: nobody seems to be sure in exactly what direction the program is going to go; moreover, the problems of development and production are diverse and, in many instances, formidable.

This attitude prevails despite the government's plan to pour \$1.3 billion into the missile program this year. A big piece of this outlay—some say as much as 30%—will go for chemical materials and research.

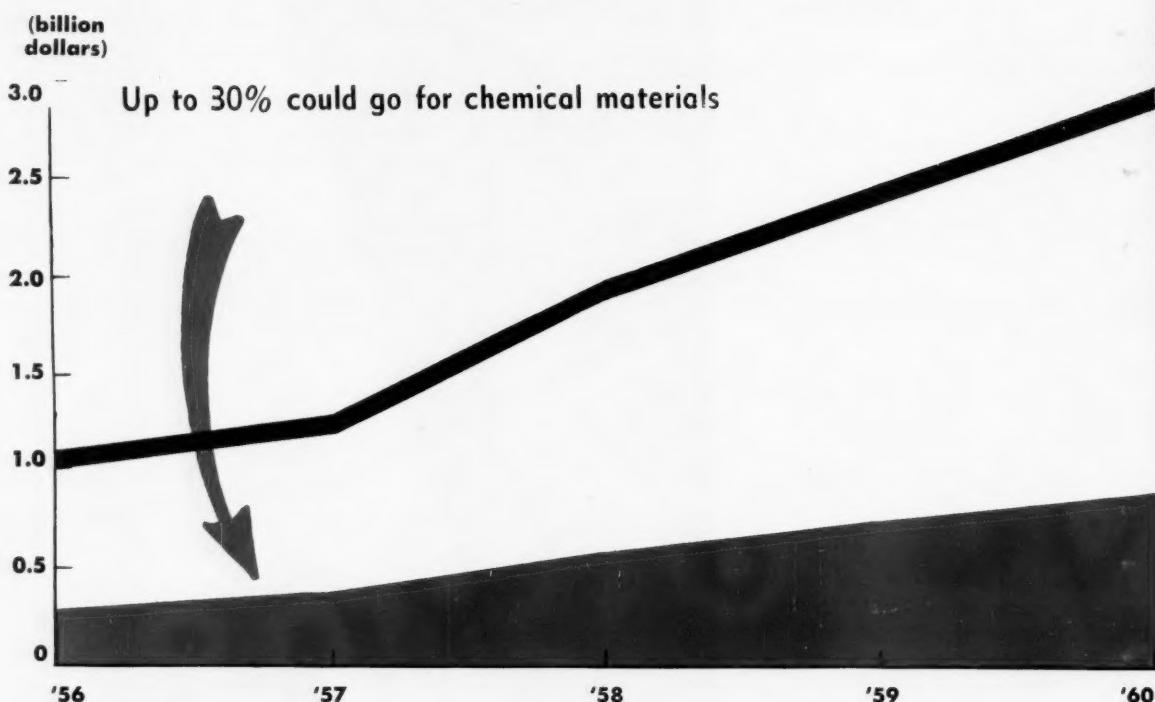
Chemical process management is

* And 68 wives.

Army's new Nike Hercules missile. Carrying atomic punch, it's now guarding key U.S. cities.



How Much Government Will Spend for Missiles



treading lightly because the program is beset with uncertainties that may force changes in its requirements. To make the plunge into missile work less of a risk, the process industries would like to find commercial outlets for the products they will develop.

At the bottom of it all is the fact that the direction the program takes is largely dependent on international politics. Military emphasis may change suddenly—much more quickly than do consumer demands. Thus, firms can operate only within limits set by changing military needs.

No Discount: But industry isn't discounting market possibilities of the missile program. For one thing, liquid-oxygen makers see a big new demand. Present outlook is for liquid oxygen, or LOX, as the missile men have dubbed it, to remain the workhorse oxidizer. While there are many new oxidizers for liquid fuels now in research stages, few can yet match the practical capabilities of liquid oxygen.

By the end of this year, over-all LOX capacity in the U.S. will be about 40 billion cu. ft., 60% above that of 1956. How much of this will

be channeled into the missile program is classified information. But whatever the amount, all signs point to more increases soon.

George Pool, president of Air Products Inc., calls the industry's present LOX capacity only "barely adequate" for testing purposes and "dangerously low" for war needs. If war came tomorrow, oxygen-using industries, such as steel, would have to channel much of their liquid oxygen to the government for missile use.

Solids vs. Liquids: Solid propellents, and the raw materials used to make them, are also in for steadily growing usage, according to talks presented at last week's meeting. Most popular, at present, is the composite type. Among components for this type are sulfur, caustic soda, formaldehyde, hydrochloric acid and methylene oxide—all products with large commercial outlets.

Thiokol Corp. (Trenton, N.J.) is among the top producers in this league and is planning to devote even more of its capacity to the missile program. Approximately 20% of Thiokol's capacity is now used for

missile fuel production—in contrast with less than 1% five years ago.

"At the end of this year," says the company, "solid propellents will really start going into large-scale production. We'll at least double our capacity, probably do considerably more than that." Aerojet-General, a division of General Tire & Rubber, will also be making substantially more solid propellant by the end of this year.

Other promising fields for development include such new propellents as nuclear fuels, boranes (see p. 48), combinations of fluorine and hydrogen; new lubricants; structural materials for combustion chambers; shell and nose materials; and plastics with high temperature-resistance and low weight for structural use.

No One Missile: One important factor for chemical management to bear in mind, is that missile researchers aren't looking for a single, optimum weapon. Each missile or category of missile is being tailored for specific end-use, and chemical researchers and management must determine in which of the categories of missiles their experience and know-how might be most

valuable. There is plenty of latitude. And management should be aware that, although there is heavy security restriction on missile information for public consumption, any manufacturer genuinely interested in further pursuing topics can get clearance and access to data from government agencies and other firms in the program.

But, despite the uncertainties of military objectives, the missile program isn't going to slow down. True, the development patterns will probably remain the same: low initial demand during experimentation, rising to a peak during actual rocket development, and dropping off when a missile and its components become operational—a situation that runs counter to most civilian production concepts. Yet, chemical firms are showing more and more interest (the CCDA program itself is proof of this), even if it is cautious interest.

New Missiles Chief

Following last week's CCDA meeting in French Lick, the U.S. missile program received added emphasis as missile development and production groups were consolidated under William Holaday, since 1956 deputy assistant secretary of defense.

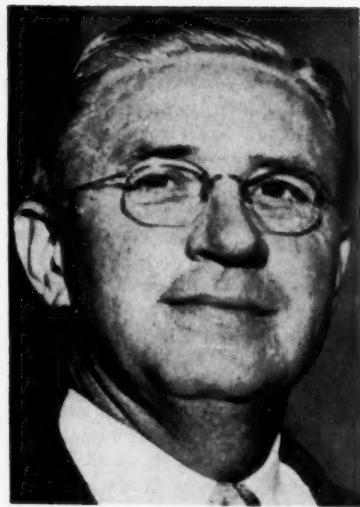
In addition to Holaday's new duties of coordinating the missile program, Defense Secy. Charles Wilson turned over to him "project vanguard"—the earth satellite slated to be launched as part of the international geophysical year program that starts July 1 and runs for the next 18 months.

It will be up to Holaday to make recommendations on what types of missiles will or won't get research and procurement dollars from the government. And because of the intense competition among companies in the program and the changing needs of the military services, his job promises to be a trying one.

But 56-year-old Holaday is no newcomer to harried, high-level Washington decision-making. In 1943, he was granted a leave of absence from Socony Mobil Oil Co. to serve the War Petroleum Administration.

After an interim stint in industry, he returned to Washington in '56 to take over his job in the Defense Dept.

Holaday has had 20 years' experience as director of research for Socony Mobil and is considered an ex-



HOLADAY: His appointment signals new accent on missiles.

pert on various types of fuel and additives. He replaces former missile chief Eger Murphree, appointed in March of last year (*CW, April 7, '56, p. 21*), who will continue to contribute his know-how to the missile program as special advisor.

Sulfur Dilemma

Standard Sulphur Co., declared bankrupt on May 7, will be involved in new litigation this week when a group of stockholders bring suit contesting the bankruptcy.

Archibald Palmer, New York City attorney claiming to represent holders of 1 million shares of Standard stock, is asking the district court in Houston, Tex., to amend the adjudication. This, says Palmer, "will enable the company to continue doing business . . . reorganize . . . and meet its obligations."

Standard has been mining sulfur at the Damon mound, Brazoria County, Texas, since 1953. It earned about \$500,000 during the first two years of operation. But from then on, profits went downhill until, in mid-April, the company couldn't meet its payroll. At that time, the union representing Standard employees attached sulfur in storage above the ground, sold it to pay the employees.

Palmer blames poor management for the company's failure, has scheduled a special stockholder's meeting this week to try to elect a new board of directors.

Unions Answer PRDC

Three large labor unions, which have vigorously opposed issuance of an Atomic Energy Commission construction permit (for a \$43.2-million reactor) to Power Reactor Development Co., last week presented their case at AEC hearings (*CW Business Newsletter, May 18*).

The three unions—United Auto Workers, International Paperworkers and International Electrical Workers—are contesting the permit, granted a few months ago by AEC. They contend that the commission has not set up sufficient safety criteria and has not determined whether PRDC has the financial qualifications to undertake the job (*CW, April 13, '57, p. 23*).

Union Witnesses: As his first two witnesses, union attorney Benjamin Sigal called Kenneth Fields, AEC's general manager, and H. L. Price, director of civilian application for the commission.

Fields, under sharply worded questioning from Sigal, testified that AEC had no criteria other than its published regulations to determine the financial qualifications of a potential atomic power project contractor.

Sigal also asked Fields to state whether AEC had any way of knowing whether a reactor would be safe at one site and not at another, and whether AEC could tell whether a site was safe before it knew the hazards of the reactor itself. Fields said these were matters of judgment at the time of deciding each individual case.

The same line of questioning was followed with Price. The questions apparently were designed to show that, except for the published regulations, AEC had no standards, codes, or criteria by which it judged license applications.

AEC attorney James Morrison repeatedly objected to Sigal's questioning, on the grounds that Fields was not qualified to make a legal interpretation of AEC regulations.

Other witnesses that Sigal will call include C. R. McCullough, chairman of the advisory committee on Reactor Safeguards; D. A. Rogers, of Allied Chemical & Dye Corp., another member of the safeguards committee.

The hearings are expected to run for several more weeks.



REYNOLD'S REYNOLDS: The neighbors were against rezoning.

Annexation Approved

City fathers of Louisville, Ky., have approved the request by Reynolds Metals Co. for the city's annexation of 42 acres adjacent county land. The parcel of land was sought by the firm as part of a site for its new research and office buildings. Next step: rezoning of the area.

Reynolds requested annexation—a move generally abhorred by industry—because residents of neighboring Lakeland, Ky., were against rezoning the area; Louisville city officials were generally in favor of it. Reynolds' vice-president, William Reynolds, made the request directly to Louisville Mayor Broaddus.

The aldermen unanimously passed an ordinance that permitted the acquisition. Reynolds' proposed site contains 55 acres, of which 13 are within city limits, the remainder outside (*CW, May 18, p. 20*).

Some years ago, a similar ordinance was proposed to annex a larger area of land containing the Reynolds site, but that ordinance was blocked by suits filed by dissident residents. Now, however, these suits have been withdrawn in view of the Reynolds request, for the smaller tract.

Another bill would provide for rezoning the 55 acres from a one-family residential district to a commercial area. This would permit Reynolds to locate its office building and research center on the land.

Louisville aldermen are now considering such legislation.

Carolina Phosphate Revival?

Phosphate mining, long ago a flourishing industry in South Carolina, may start up again if plans of a newly formed company there materialize.

The company, Beaufort Mining & Development Co., last week revealed that it has already completed preliminary surveys, will shortly begin examination of the economic possibilities of mining and processing phosphate ore deposits in the South Carolina tidelands. The company has located a number of phosphate sources, plus those of other heavy minerals. These have not yet been revealed.

Other Searches: Renewed interest in mineral deposits in the state has been evident in the recent past. At least one company is searching for alumina deposits there (*CW, Feb. 2, p. 24*), and others are reportedly looking, too.

Moreover, it's generally believed by state geologists that South Carolina has larger minerals deposits than is ordinarily assumed. In that connection, the state development board is preparing to launch the state's first full-scale geological study of mineral resources. The study will be conducted under an initial survey appropriation of \$24,000, expected from the legislature.

In the past, the state has employed, on a part-time basis, students of universities and colleges in the area to make such explorations, usually upon specific requests for information by industries that were seeking to locate there.

Ultimately, a long-range study will be undertaken; it will include surveys of kaolin clay, limestone and marl deposits, among others.



Old Mill Readies for Visitors

This week in Wilmington, Del., the reconstructed Eleutherian Mills and Hagley Yards—scenes of Du Pont Co.'s early powdermaking operations—will go on public view.

Basic in most companies' public relations programs is showing the beneficial effects of industrial development. Yet, few firms have had the opportunity of Du Pont—founded in 1802 on Wilmington's Brandywine Creek—to trace the parallel

development of the company and the nation.

Sponsored by a foundation endowed by the company and by the descendants of its founder, the museum will show Du Pont's growth beside Wilmington's. Among other Du Pont efforts on the same note: two books (*Du Pont: 140 Years; Du Pont: Autobiography of an American Enterprise*), a movie (*The Du Pont Story*).

COMPANIES

St. Gobain, France's largest glass manufacturer, is planning to merge its wholly owned U.S. subsidiary, Blue Ridge Glass Corp. (Kingsport, Tenn.), with American Window Glass Co. (Pittsburgh). The new firm would then build a plant to manufacture a complete line of flat-glass products.

St. Gobain stockholders have already authorized the company to float a \$15-million loan abroad as soon as U.S. and French government approval of the merger has been granted.

Archer-Daniels-Midland Co. (Minneapolis) is negotiating to acquire Federal Foundry Supply Co. (Cleveland). If the transaction is completed, ADM plans to continue operating Federal Foundry as a wholly owned subsidiary. ADM said it will be several weeks before a final decision on the acquisition can be reached.

EXPANSION

Phosphoric Acid: A. R. Maas Chemical Co., a division of Victor Chemical, will build a phosphoric acid plant and a catalyst unit near Richmond, Calif., where it has just purchased a 75-acre industrial site (*CW Business Newsletter*, April 20).

Potash: International Minerals & Chemical Corp. will immediately start sinking a shaft for a new potash mine near Esterhazy in the Canadian province of Saskatchewan. The property consists of 450,000 acres to which International has mineral rights. IMC president, Louis Ware, said the ore has proved to be of higher quality than the company's large reserves in Carlsbad, N. M., and that the new mine would produce at "more than twice the rate" of the Carlsbad facility.

Rubber Chemicals: Monsanto Canada Ltd., affiliate of Monsanto Chemical Co., will start producing accelerators and antioxidants used in making synthetic rubber. Production will get under way this fall at the Monsanto Ville LaSalle plant at Montreal.

Nuclear Power: Carolinas-Virginia Nuclear Power Associates Inc. has signed an agreement with Westinghouse Electric to develop a nuclear power plant. It would be built on a site in the area served by the four power companies making up the Nuclear Power Associates membership. Completion date: 1962.

Carbon Dioxide: Gas-Ice Corp. (Portland, Ore.) has started construction of a \$300,000 plant near Finley, Wash., to manufacture liquid carbon dioxide and dry ice. Output will go to the Atomic Energy

Commission's nearby Hanford Works, operated by General Electric Co. Liquid carbon dioxide will be in production this July; dry ice, later this year.

Alumina: Reynolds Metals Co. will expand the capacity of its La Quinta, Tex., plant from 550,000 tons/year to 730,000 tons/year. New installations should be ready by late 1959. The project will enable the La Quinta plant to provide alumina for the \$88-million aluminum plant Reynolds will build along the St. Lawrence Seaway in New York state.

FOREIGN

Butanol/United Kingdom: Britain's \$2.8-million-a-year imports of butanol—most of it from the U.S.—will be drastically reduced by a just-completed carbonylation plant at Billingham, County Durham, Eng. Imperial Chemical Industries says its new plant will increase the company's production of butanol seven-fold.

Imports/Argentina: The U.S. is conspicuously absent from a list of free import zones for chemical products as defined by Argentina's Central Bank. Automatic import permits for a number of chemicals will be granted for purchases from only the following zones or countries:

The sterling area, Austria, Brazil, Bolivia, Czechoslovakia, Chile, Denmark, Finland, Hungary, Israel, Italy, Japan, Norway, Paraguay, Poland, Netherlands, Romania, Sweden, Switzerland, U.S.S.R., Belgium-Luxemburg, Uruguay, Yugoslavia, and the French franc zone.

Tapioca/India: Corn Products (India) Ltd., a wholly owned subsidiary of New Jersey Corn Products Refining Corp., will be one of a trio of firms setting up a \$500,000 tapioca starch plant in Kerala under the name of Pampa River Starch Co. The other two partners: East India Distilleries & Sugar Factories Ltd. (Indo-UK firm) and Travancore Sugar and Chemicals, Ltd. (India). Initial production will be 30 tons/day, to be upped to 60 tons by 1961. The Indian government insists that 75% of output be exported.

Rayon/India: Indian industrialist Birla is negotiating with foreign firms for equipment for his to-be-built rayon plant in Mogra, West Bengal. His Bombay rayon plant—Century Rayon Ltd.—was equipped with machinery supplied by the U.S. firm Von Kohorn International Corp.

Potash/Germany: West German potash fertilizer sales between April 30, 1956, and April 30, '57, amounted to 1.73 million tons, of which 729,000 tons (worth \$50 million) were exported. This is 7.2% more sales than in the year before.

Molecule with a Future



Now Available in Tank Car Quantities . . .
99+% *Pure Dimethyl Sulfide*

For the first time, bulk quantities of low-cost, 99+% pure dimethyl sulfide are available to industry.

Dimethyl sulfide is a simple organic liquid derived by Crown Zellerbach Corporation from lignin and sulfur under exclusive patent rights. Integration of its production with the kraft pulping process affords reduced cost and tank car availability which will project dimethyl sulfide into applications heretofore considered uneconomical.

Suggested application: Crown dimethyl sulfide is useful both as a basic chemical and as an inter-

mediate in the synthesis of sulfur compounds. It is also well suited to the following functions:

- As a solvent in extraction.
- As a solvent vehicle.
- As an odorant or masking odor.

The staff of the Chemical Products Division of the Crown Zellerbach Corporation offers its research facilities to explore applications of specific interest to you. For information brochure concerning properties, solubilities, chemical reactions, and uses of this important industrial chemical write to:

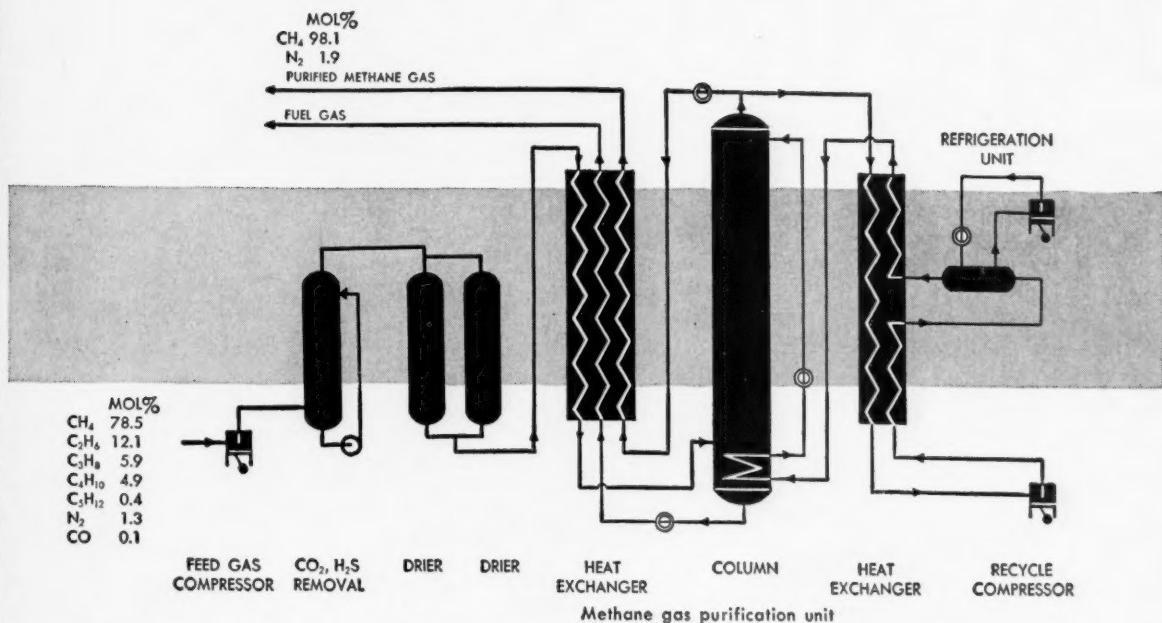


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CHEMICAL PRODUCTS DIVISION
CAMS, WASHINGTON

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In the production of chlorinated methane compounds and other chemicals based upon methane, the methane processed must be of ultra high purity. Air Products low-temperature processing plants—accepted as the most economical and practical approach—produce methane containing less than 100 p.p.m. of other hydrocarbons.

Air Products methane purification plants feature many cost-saving and special processing advantages:

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- valuable by-products—LPG, other heavy hydrocarbons, nitrogen.
- automatic control—requiring a minimum of labor.
- low power consumption.
- factory-assembled plants—assuring minimum installation expense.

Many chemical plants are already using Air Products low-temperature equipment. In addition to the production of ultra high-purity methane, Air Products units are being used for the production of oxygen, nitrogen, argon and hydrogen . . . as well as the processing of natural gas, carbon monoxide, deuterium, fluorine and helium.

Here at Air Products, we design, manufacture, erect and operate . . . package, tonnage and custom-built industrial gas separation, liquefaction and purification systems. No matter what your requirements, Air Products will find a way for you to acquire or lease low-temperature equipment on mutually convenient and beneficial terms. Your inquiry is invited. Air Products, Incorporated, P. O. Box 538, Allentown, Pa.

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Washington Newsletter

CHEMICAL WEEK
May 25, 1957

Import protection for domestic minerals producers is coming.

The Administration doesn't like the idea of having to reverse its generally freer trade policy. But to keep on living with domestic producers of fluor-spar, magnesium, tungsten, lead, zinc, etc., it is drafting a new policy.

Interior Secy. Seaton is ready to present to Congress a long-range program, including tariff and quota relief, for domestic industries. There may also be tax benefits and investment stimulants—these policies are not yet set.

The barter program—trading agricultural crops for strategic goods—is also in for a review. The policy, right now, is up in the air. State Dept. is smarting from foreign charges of "dumping" of wheat, corn and cotton. And the Commodity Credit Corp. is complaining that the trading of crops for "deal" minerals is upsetting the government's own domestic cash sales.

Many chemically processed material are involved. The barter program has brought in some \$500 million worth of titanium, manganese, fluorspar, lead and zinc since 1949. And the program can be stepped up. Some domestic producers, though, object that the imports undercut them. Look for a new policy, reviving barter on a smaller scale, within the next few days.

The McKesson-Robbins "fair trade" case is settled—marking a rule of the road for manufacturer-wholesaler practices. Last week's decision by the government and the company on a consent decree makes these points: (1) a manufacturer-wholesaler cannot fair-trade its products to independent wholesalers; (2) McKesson-Robbins may not sign such contracts with competing drug wholesalers on its branch products; or (3) refuse to sell to wholesalers who have not agreed to maintain prices.

Washington believes the 1957 wage pattern will even out at 6%. That would make the recent settlements in the petroleum and chemical fields just about average. The most recent contracts call for about a 16¢ increase to \$2.81/hour for chemical workers. The built-in steel and auto worker increases will be about the same.

The Administration will insist on continued fast amortization for research and development—whether directly tied to defense contracts or not. The legislation by Sen. Harry F. Byrd (D., Va.) is still fuzzy on the issue. Two expansion groups the Administration wants to continue to encourage: liquid oxygen and nitrogen. Officials say they cannot live with a policy that would require a company seeking fast write-offs to have a defense contract "in hand."

Charting Business

CHEMICAL WEEK

May 25, 1957

Paint Requirements for New Ships Under Construction*

(gallons)

	6,000-GT. Cargo Ship	16,000-GT. Passenger Ship	24,000-GT. Tanker
Outside Hull			
Primer	380	1,050	1,480
Anticorrosive	142	390	560
Antifoul	95	210	370
Boot top	47	130	180
Topside hull	86	220	340
Inside Hull	5,950	15,000	6,170
Total gallons consumed	6,700	17,000	9,100

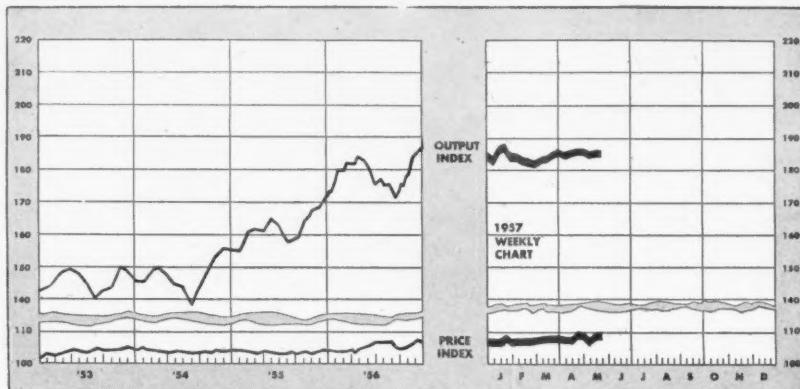
*Gross tonnage (G.T.) of ships shown are average sizes of new ships under construction in private shipyards in the U. S.

Source: *Marine Engineering/Log*.

Marine Paint: 5 Million Gal. in '57

MORE than 5 million gal. of paints and coatings will be used this year for existing merchant vessels and craft under construction in private domestic shipyards. This is exclusive of naval and

pleasure craft. The breakdown: some 3.7 million gal. for maintenance of existing merchant ships, about 1 million gal. for abuilding ships, the remainder for foreign ships under repair in U.S. shipyards.



Business Indicators

WEEKLY

Chemical Week output index (1947-49=100)
Chemical Week wholesale price index (1947=100)
Stock price index of 11 chemical companies
(Standard & Poor's Corp.)

Latest Week	Preceding Week	Year Ago
186.6	186.4	181.1
110.1	110.0	105.8
45.49	44.47	48.37

MONTHLY—Trade (million dollars)

	Manufacturers' Sales			Manufacturers' Inventories		
	Latest Month	Preceding Month	Year Ago	Latest Month	Preceding Month	Year Ago
All manufacturing	28,933	29,130	27,095	52,239	51,903	47,433
Chemicals and allied products	2,080	2,023	1,939	3,829	3,796	3,361
Petroleum and coal products	2,728	2,731	2,567	3,096	3,084	2,785

25

Serving the
chemical
industries
since 1932



In this, our 25th year of service to the chemical industries, we reflect upon the significant developments of the past and our contribution to the chemical world of the future.

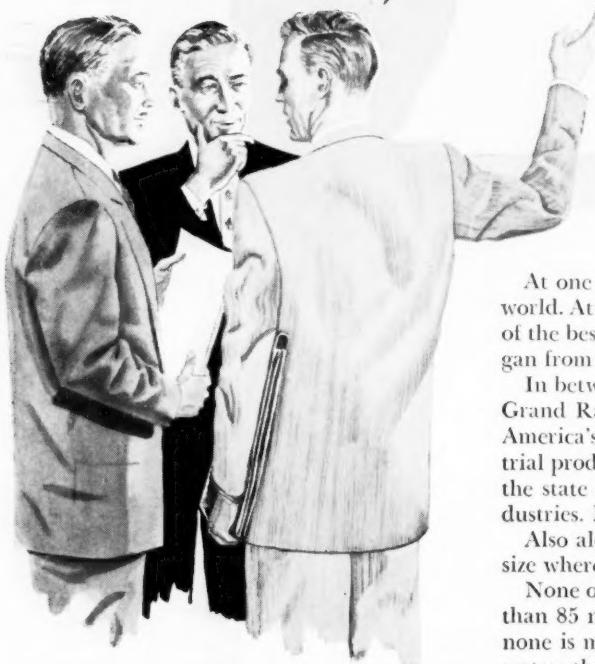
The completion of our new research laboratory and the recent acquisition of Truland Chemical Company, with one of the nation's most modern distillation plants, exemplifies our pledge of continued service, expanded facilities and improved products.



The TRUBEK LABORATORIES Inc.

EAST RUTHERFORD, NEW JERSEY

**There's Great
Industrial
Opportunity
Along the Route
to Lansing,
Grand Rapids
and Muskegon**



MICHIGAN

ONTARIO CANADA

IND. OHIO

At one end of the road is Detroit, automotive capital of the world. At the other is Muskegon, busy industrial center, with one of the best harbors on the Great Lakes — just across Lake Michigan from Chicago and Milwaukee.

In between are two of America's finest cities of moderate size, Grand Rapids and Lansing. Grand Rapids produces much of America's finest furniture, but the major part of its large industrial production comes from metal-working industries. Lansing, the state capital, is home of Oldsmobile and many diverse industries. Michigan State University is in East Lansing.

Also along this route are substantial communities of smaller size where living is pleasant and industry busy.

None of them — in fact, no community in Michigan — is more than 85 miles from the Great Lakes-St. Lawrence system. And none is more than a few minutes' drive from beautiful inland waters that offer boating, fishing and swimming.

Put your plant where industry thrives and business is good — in Outstate Michigan.

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ADMINISTRATION



W. J. VAN BORSELEN

DOING BUSINESS IN HOLLAND: Natural and economic advantages team up to make a . . .

Choice Outpost for European Operations

Behind the news of last fortnight's opening of Merck & Co.'s new pharmaceutical plant in Haarlem (Netherlands) is a story of significance for U.S. chemical process management contemplating overseas expansion.

A building European common market, plans for an even larger European Free-Trade Area, traces of "economic nationalism" and an acute dollar shortage in many potential U.S. markets are some of the factors prompting this country's industrial management to consider new or expanded overseas manufacturing facilities.

A primary consideration in deciding to manufacture overseas is, "Where will it be?" The answer, of course, depends on a number of factors; and to make the decision more difficult, a number of countries are beckoning to foreign capital and industry.

The Netherlands is making that pitch in an effort to fill the gaps in that country's economy, and—according to Merck officials—it's a country with a great deal to offer U.S. industry.

Advantages in Trade: Since a major portion of the

capacity of a Dutch subsidiary plant would be exported to world markets, proximity to those markets is an important consideration. Holland is in effect centrally located in relation to major European markets, and its freedom of trade with most European countries affords ready access to those markets. The distance from Amsterdam to Berlin is 411 miles; to Dublin, 286 miles; to Lisbon, 1,445 miles; to London, 118 miles; to Paris, 304 miles; to Rome, 1,016 miles; and to Vienna, 709 miles.

In addition to the recently formed European Economic Community and the proposed broader European Free-Trade Area—both of which will have the effect of reducing trade barriers between nations over a period of time—Holland is a member of the Benelux Customs Union and a party to the European Payments Union and Code of Liberalization under the Organization for European Economic Cooperation (*CW*, April 20, p. 120).

Under the provisions of the Benelux Customs Union—between Belgium, Luxembourg and the Netherlands—

ONE-CARBON FRAGMENTS*

KAY-FRIES

TRIETHYL ORTHOFORMATE



TRIMETHYL ORTHOFORMATE



SODIUM FORMALDEHYDE
BISULFITE



*Intermediates used to supply one carbon atom in organic synthesis.

TECHNICAL DATA AVAILABLE



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ADMINISTRATION

the same import duties are applied throughout the Benelux area, and no duties are levied on trade between members.

The European Payments Union operates as a sort of clearinghouse through which an OEEC member country can make payments to another member from its income from trade with all members. Thus, the bilateral balance with one country is not important—only the balance with the whole group.

Further assisting European trade, the Code of Liberalization obligates member countries to admit at least 90% of their imports from other OEEC countries without quantitative restrictions.

Government Cooperation: The presence of Prince Bernhard, a Queen's Commissioner and representatives of the Ministry of Economic Affairs at the recent dedication of the Merck Sharp & Dohme Nederland N. V. plant is not surprising to those who talk of their business dealings with Holland. The Dutch government is anxious to cooperate with foreign industry.

The lack of red tape involved in getting permission to set up a plant in the Netherlands was cited often by Merck officials. As Antonie Knoppers, vice-president and general manager of Merck Sharp & Dohme International, and Dutch himself, has expressed it,

"One of the main assets in Holland is the straightforward approach of the people."

The promptness with which Merck's plans were approved shows that the Dutch mean business. In May, '54, a delegation from Merck went to the Netherlands to talk over a possible plant with the Ministry of Economic Affairs.

On July 30, '54, Merck made a formal application for approval of its plans; and on the following Aug. 13, the Director-General of Industrialization and Power Supply gave the government's approval.

Labor Cooperation: Another "plus" that Merck management found in Holland was cooperative labor. Skilled labor is "tight," but management enjoys relative freedom from labor difficulties.

Dutch unions are organized according to branches of industry, and there's evidence, U.S. businessmen familiar with the situation say, that union leaders have a positive attitude toward national economic problems. Authoritative spokesmen have cited labor cooperation as a significant and necessary factor in Holland's somewhat spectacular postwar recovery.

In 1955, 132,994 working days were lost to strikes. Taking the 1936-39 value (lost days due to strikes) as 100, the 1955 index figure was 163. In terms of total man-days worked in



GROUND BREAKING: Plant manager, Anton Reiche, readies his sledge.

another **ONE STOP** shipment of
Sodium Phosphates from **BLOCKSON**

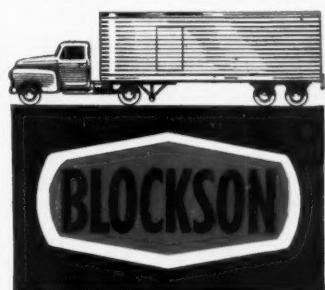


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schedule changes. Carload price on each chemical. It makes sense.

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Phosphate Chlorinated • Disodium Phosphate • Monosodium Phosphate • Hydrofluoric Acid • Sulfuric Acid • Sodium
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May 25, 1957 • Chemical Week



News

Wherever
CORROSION
RESISTANCE
is a Factor...



HAVEG DUCT solves SO₂ fume removal problems

RESISTANCE TO ACID ATTACK MAKES THE DIFFERENCE AT ATLANTIC REFINING COMPANY ACID PLANT

Production of 150,000 lbs. of sulphuric acid daily posed a major corrosion problem for Atlantic Refining Company at its Philadelphia plant. Vapors boiled off from refinery sludges during recycling operations in the recovery plant contain SO₂ concentration as high as 65%... at temperatures up to 250°F! After testing several materials for required properties, Haveg 41 was selected for installation of the fume duct and scrubbing system pictured above. The result? No evidence of corrosion—after more than two years of continuous operation!

Haveg Performance Proved by Experience
Three 18" ducts feeding into an 18" header carry the gas to a scrubber 36" in diameter and 29' in height, also constructed of Haveg 41. Since installation of the Haveg fume removal and scrubbing system

external corrosion of other equipment has been substantially reduced. Elsewhere at the plant Haveg pipe, processing vessels and duct installations have proved Haveg's exceptional resistance to corrosion, physical strength and thermal versatility for over 15 years of superior performance.

A Haveg Plastic for Every Service Requirement
No other material offers as wide a range of effective resistance to corrosive acids, hypochlorites, salts, alkalies, and solvents as the Haveg plastics. Custom design and field service assures you full advantage of Haveg's low net cost for every process installation. Let a qualified Haveg corrosion engineer help you determine the Haveg plastic and equipment design best suited for your needs... or write for Haveg Bulletins describing the complete line of corrosion resistant equipment.

H-701

**HAVEG PLASTICS OF TOMORROW SOLVE YOUR CORROSION PROBLEMS TODAY IN
PIPING • PUMPS • PROCESS TANKS • FUME DUCTS • VALVES • HEAT EXCHANGERS**

HAVEG INDUSTRIES, INC.

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ADMINISTRATION

'55, time lost to strikes represented 0.014%.

Native Chemical Industry: From 1945 through '53, total investment in the Dutch chemical industry—excluding synthetic fibers and oil refining—was \$300 million. During '53, chemical production was valued at \$400 million, 7.7% of all industrial production.

Chemical imports in that year were valued at \$165 million, and exports totaled \$180 million. In '54, they were \$210 and \$215, respectively.

Domestic chemical production continues to expand, with the pace being set by the government-operated State Mines—one of the three largest Dutch chemical producers, along with Royal Dutch Shell and Royal Netherlands Salt Works.

There is much to suggest that the Netherlands has a lot to offer U.S. companies as a base of operations in Europe. Dow Chemical Co.—whose Dutch subsidiary Nederlandsche Dow Maatschappij N.V. is now in the warehousing and terminal stage—offers as its summation of Dutch advantages the following: good banking facilities and financial channels for trading, good port and transportation facilities, flexible and fair taxation, low labor costs (manufacturing in general has a wage index of 155 for '56, using '47 as a base of 100), relatively minor labor troubles and good technical and educational facilities (17% of the university students enrolled in 1954-55 were in technical sciences).

Thus, the over-all picture of this country of 10.8 million people is attractive to a U.S. firm looking for a European plant site. Holland's position now is important. And with the coming of a European Economic Community, she may well become strategic for U.S. chemical process firms seeking to compete in European markets.

LEGAL

Antitrust Logjam: New antitrust laws aren't expected to cause chemical process management much trouble in the immediate future. Reason: antitrust legislation seems to have bogged down in both houses of Congress.

Caught in the Congressional logjam are two bills tabbed early this session for special consideration: (1) the bill limiting the scope of the "good faith" amendment to the Robinson-Patman



This man has tied his future to phenol

(*New process engineers know Dow Phenol is here to stay*)

"You can depend on Dow"—that's a meaningful phrase for new process engineers in our phenol department. For they have discovered these words to be more than mere promise.

It was in 1915 that we started work on a new production process, using benzene and salt as basic raw materials. Thus began the progress that makes available adequate supplies of phenol for industries around the world.

And today, as in the past, our phenol production grows in advance of customer needs to assure users good supply

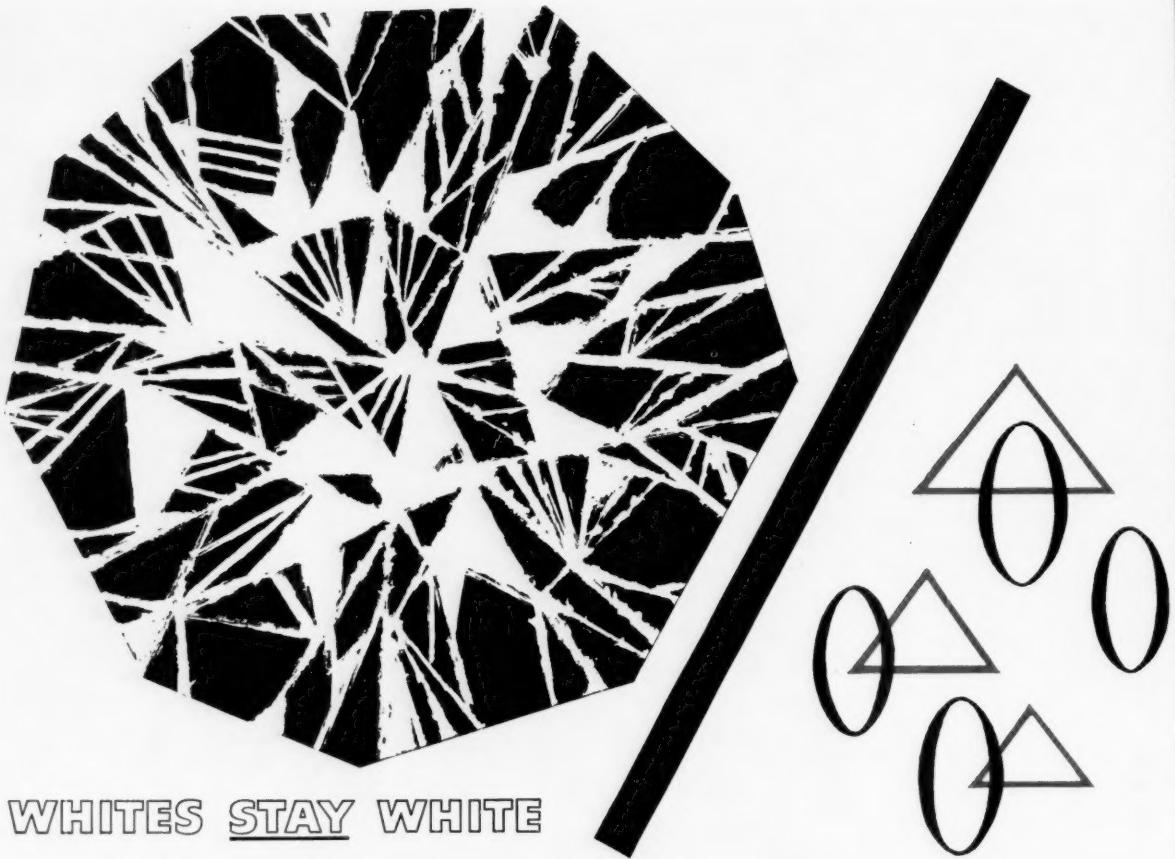
when and where phenol is needed.

For this reason, our new engineers find that here is the opportunity to progress in a department that's firmly footed. Here, there is a plan that anticipates the future— safeguards the customer's future — through quality production and expansion.

Makes sense to tie your future to Dow Phenol... today!
THE DOW CHEMICAL COMPANY, Dept. BD 831A-1, Midland,
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Now for the first time a double pressed stearic with Guaranteed Color Stability!

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CW5



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Armour Chemical guarantees to deliver Neo-Fat® 18-54 with a color stability of 4.0R—30Y maximum on a 5½" Lovibond scale.*

Never before has any double pressed stearic had such a guarantee. Never before have you had such positive assurance of uniform, superior quality in your finished products. And it's important to note that typical production runs are averaging 2 to 2½R-15Y! Test Neo-Fat 18-54 to prove to yourself this is the finest double pressed stearic available.

COMPARATIVE TESTS PROVE NEO-FAT 18-54 CAN TAKE IT!

INITIAL COLOR — LOV. 5½"

	Armour	Product V	Product W	Product X	Product Y
0.3R	2Y				
0.6R	2.5Y				
1.2R	3Y				
0.5R	2Y				
0.9R	3Y				

GLYCEROL MONESTER TEST — LOV. 5½"

	Armour	Product V	Product W	Product X	Product Y
0.3R	1Y				
1.4R	5Y				
4.0R	16Y				
1.1R	4Y				
2.9R	11Y				

SULFURIC ACID TEST — GARDNER COLOR

	Armour	Product V	Product W	Product X	Product Y
1					
2-3					
6-7					
4					
2-3					

SPECIFICATIONS

	Min.	Max.
Iodine Value	5	7
Acid Value	208	211
Titer, °C	53.9	54.4
Color, Lovibond (5½")	—	0.5R-2Y
COLOR STABILITY (5½")	—	4.0R-30Y
Unsaponifiable %	0.5	
Moisture %	0.5	

*Heat stability test (200°C for 2 hours) for color currently under study by A.O.C.S.—Copy of procedure on request.

ADMINISTRATION

HIGHEST PURITY FATTY ACIDS



Only Armour uses fractional distillation and solvent crystallization to produce a complete line of uniform fatty acids. These Neo-Fat® fatty acids are offered in single components in purities as high as 96%. Yet you pay no premium in price. Write us for samples and further information.

SHORT CHAIN SATURATED FATTY ACIDS

Neo-Fat	12 Lauric Acid
	14 Myristic Acid
	263 Lauric 50—Myristic 50
	270 Lauric 70—Myristic 30
	273 Lauric 80—Myristic 20
	276 Lauric 90—Myristic 10
	255 Stripped Coco
	265 Distilled Coco

LONG CHAIN SATURATED FATTY ACIDS

Neo-Fat	16 Palmitic Acid
	16-54 Eutectic Palmitic-Stearic
	18 Stearic Acid
	18-61 Stearic-Palmitic Acid
	18-53 Single Pressed Stearic
	18-54 Double Pressed Stearic
	18-55 Triple Pressed Stearic

OLEIC ACIDS

Neo-Fat	94-04 Low Titer Red Oil
	94-10 High Titer Red Oil
	92-04 Low Titer White Oleic

UNSATURATED FATTY ACIDS

Neo-Fat	47 Distilled Animal Type Acid
	55 Distilled Palm Type Acid
	65 Distilled Animal Type Acid
	95 Distilled Cottonseed Type Acid
	105 Distilled Cottonseed Type Acid
	110 Distilled Corn Type Acid
	122 Distilled Soya Type Acid
	127 Distilled Soya Type Acid

ARMOUR

Leader in Progressive
Fatty Acid Chemistry



SEN. O'MAHONEY: After the meat industry comes premerger notification.

Act, and (2) the bill requiring that firms notify the government of impending mergers.

Sen. Joseph O'Mahoney (D., Wyo.)—the latter bill's strongest backer—is busy investigating the meat industry. The "good faith" bill has been held back for an oil industry probe and a statistical study of concentration in industry (*CW Washington Newsletter*, May 18).

Vitamin Suit: Merck & Co. (Rahway, N.J.) has appealed to the U.S. Circuit Court of Appeals the recent decision of the district court in Virginia in a patent infringement suit against Olin Mathieson Chemical Corp., New York. The decision: that Olin Mathieson had not infringed Merck's U.S. patent 2,703,302 relating to vitamin B-12 concentrates.

Merck officials also plan to prosecute a pending suit against OM, alleging infringement of Merck's U.S. patent 2,530,416, relating to the conversion of vitamin B-12 analogs into vitamin B-12.

Salk Test: Two of the more than 25 suits (totaling \$6 million) against Cutter Laboratories (Berkeley, Calif.) alleging distribution of faulty antipolio Salk vaccine have been consolidated and set for trial in Alameda, Calif., superior court on Aug. 12. This litigation—asking a total of more than \$600,000 in damages—will serve as a test case.

Secrecy Suit Stalled

Inability to reach agreement on how to handle "trade secrets" appears to be preventing a pretrial hearing from being held this spring in the lawsuit between Monsanto Chemical and an engineer formerly employed by that company (*CW*, March 23, p. 36); but the trial itself is still scheduled for October.

In his reply—filed last fortnight—to Monsanto's charges of wrongful disclosure of confidential information to a competing firm, defendant Charles Miller admits that while he was employed by Monsanto he had access to blueprints and other data. He also admits that he has been collaborating with the F. C. Torkelson engineering concern in its design and construction of a phosphate fertilizer plant for Central Farmers Fertilizer Co.

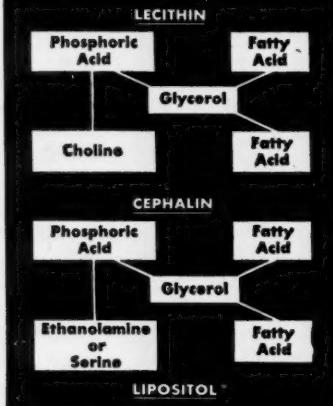
But Miller insists that in his professional capacity as a mechanical engineer it was not wrong for him to keep and use the documents that came into his possession. He denies that the data he acquired was secret and confidential; and he also states that the electric furnace plant being built for Central Farmers at Georgetown, Idaho, "is not for the purpose of manufacturing elemental phosphorus, but is for the manufacture of products that [he] believes are not manufactured [by Monsanto] at its Soda Springs plant."

Monsanto reports that its lawyers have received from Miller 102 blueprints, specifications, cost data and other documents concerning the company's No. 8 electric furnace for phosphate reduction at Soda Springs. In a pretrial examination, Miller and his lawyers had agreed to furnish those papers for inspection. Miller's deposition acknowledges acquisition of the documents while he was employed at that plant. Miller admits having removed the labels from those papers, but says this was a common practice.

Monsanto is asking for a court order to keep Torkelson and Central Farmers from receiving or using process information that Miller's Monsanto employment contract forbids him to disclose to competitors. Miller's reply asks that the complaint be dismissed. Expectation is that Monsanto's actions against Torkelson and Central Farmers will not be pushed until the Miller suit is settled.

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ADMINISTRATION

IDEAS

Executives' Correspondence Course:

The Industrial College of the Armed Forces (Washington, D. C.) is offering to civilian executives a correspondence course that—in case of national emergency—might prove helpful even to companies without prime defense contracts.

Titled "Emergency Management of the National Economy," the course is intended to educate key industrial plant personnel to the all-important civilian-military relationship upon which the nation depends during an era of constant readiness and in the period of a national emergency.

Rural Offices Favored: Confirming what many already know, New York architect Kenneth Ripnen says rural or suburban sites for office buildings, research laboratories and similar structures have definite advantages for chemical companies. Reasons: chemical firms are notable for growth and for adapting their operations to changing technology—so a chemical concern's headquarters should have flexibility for new desk and equipment patterns. A city project, he says, involves a number of limitations—for example, zoning ordinances, orientation factors and esthetic compromises—while a rural project permits more freedom.



WIDE WORLD

JUDGE BASTIAN: On 'hot cargo' issue, a conflicting opinion.

to handle freight from a company they considered unfair"; and the handling of such freight, he went on, was "exactly what the carriers had agreed their employees would not be required to do."

• Last month, an examiner for the Interstate Commerce Commission declared that "hot cargo" contracts are in violation of the Interstate Commerce Act. The 11-member ICC is expected to pass on this ruling later this year.

LABOR

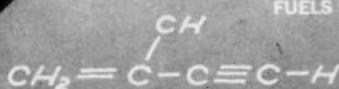
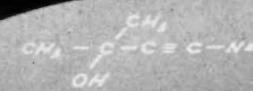
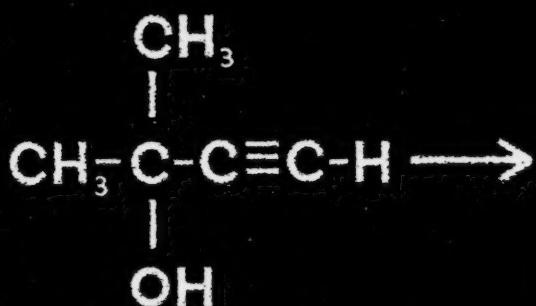
'Hot Cargo' Conflict: Heading toward ultimate decision by the U.S. Supreme Court—or possibly by Congress—is the issue of "hot cargo" clauses, which are used by the AFL-CIO Teamsters' union to permit its truck-driver members to refuse to haul merchandise to or from struck plants. So far, there are conflicting rulings from various authorities:

• For a number of years, the National Labor Relations Board has regarded any attempt to enforce a "hot cargo" clause as a violation of the secondary boycott prohibition in the Taft-Hartley Act.

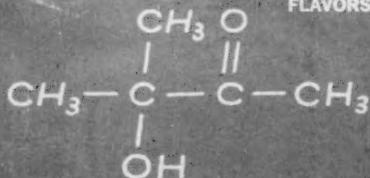
• Several U.S. circuit courts have upheld NLRB's position in various cases; but last fortnight, the Court of Appeals at Washington, D.C., reversed a similar NLRB finding. Circuit Judge Walter Bastian wrote that the Teamsters' local union in Oklahoma City had merely urged its members "not

Oil Wage Issue: Two days after the Denver meeting at which the bargaining policy committee of Oil, Chemical & Atomic Workers (AFL-CIO) set a 27¢/hour wage increase as the major goal in oil labor contracts this year, an OCAW local union started a strike that may have considerable effect on the industry's 1957-58 wage pattern. That strike—directed against Crown Central Petroleum Corp.'s refinery at Houston, Tex.—was called because of "local issues," according to OCAW; but it came while union and management representatives were holding vital bargaining sessions at Port Arthur, Tex. Those sessions were expected to lead to agreements covering an estimated 45,000 employees at refineries and petrochemical plants along the Texas-Louisiana Gulf Coast. OCAW's oil bargaining policy committee meeting came five months after its last previous session, Dec. 8, at which an identical wage increase goal was set.

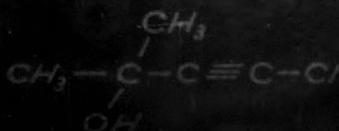
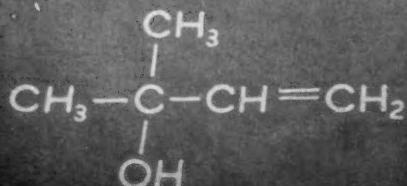
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KEY CHANGES

Hiram B. Young, to vice-president; and **F. Leonard Bryant**, to vice-president, production; Hooker Electrochemical Co. (Niagara Falls, N.Y.).

Stuart Z. Krinsky, to director, Sun Chemical Corp. (Long Island City, N.Y.).

Edgar B. Chiswell, to executive secretary, California Chemical Co., newly formed subsidiary of Standard Oil Co. of California.

John D. Hetchler, to manager, chemical division, Werner G. Smith, Inc. (Cleveland).

Joseph C. Duke and **Bert S. Cross**, to directors, Minnesota Mining & Mfg. Co.

Stanford A. Allen, to president, Insecticidas Ortho, S.A., Mexican affiliate of California Spray-Chemical Corp. (Richmond, Calif.).

Frank C. Cleary, to president, Warner-Lambert Ltd. of Canada, a subsidiary of Warner-Lambert (Morris Plains, N.J.).

Albert Muller, to assistant to the president, Air Reduction Sales Co., a division of Air Reduction Co. (New York).

John B. Childress, to product manager for industrial chemicals, Frontier Chemical Co. (Wichita, Kan.).

Gerhard Barth-Wehrenalp, to director, Inorganic Research Dept., Pennsalt Chemicals Corp. (Philadelphia).

Sidney Factor, **Alfred Firestein** and **Menache Politi**, to vice-presidents, Max Factor & Co. (Hollywood, Calif.).

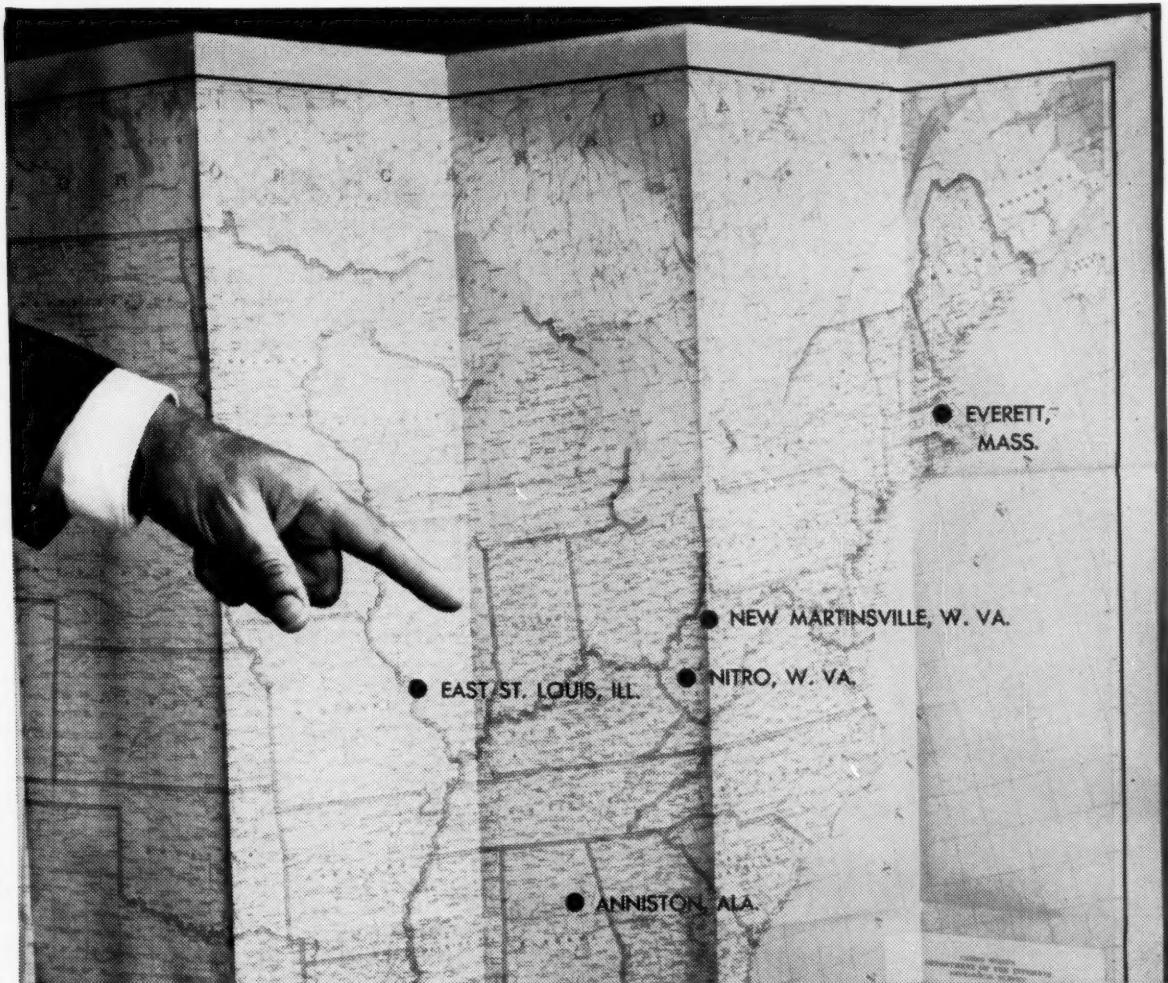
William M. Haile, to president, Linde Co., division of Union Carbide Corp.

G. Russell Tantum, to president; and **William A. Bain, Jr.**, to vice-president; Vitro Laboratories, a division of Vitro Corp. of America (New York).

James H. Joyner, to general manager, Pioneer Works, Quaker Rubber Division (Philadelphia), H. K. Porter Co. (New York).

H. B. Stafford, to operation manager, Technical Products Division, Mine Safety Appliances Co. (Pittsburgh).

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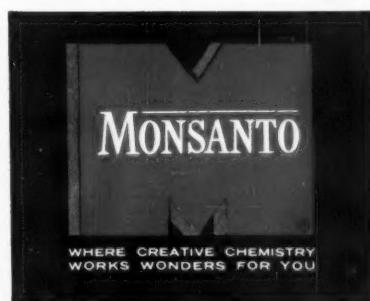
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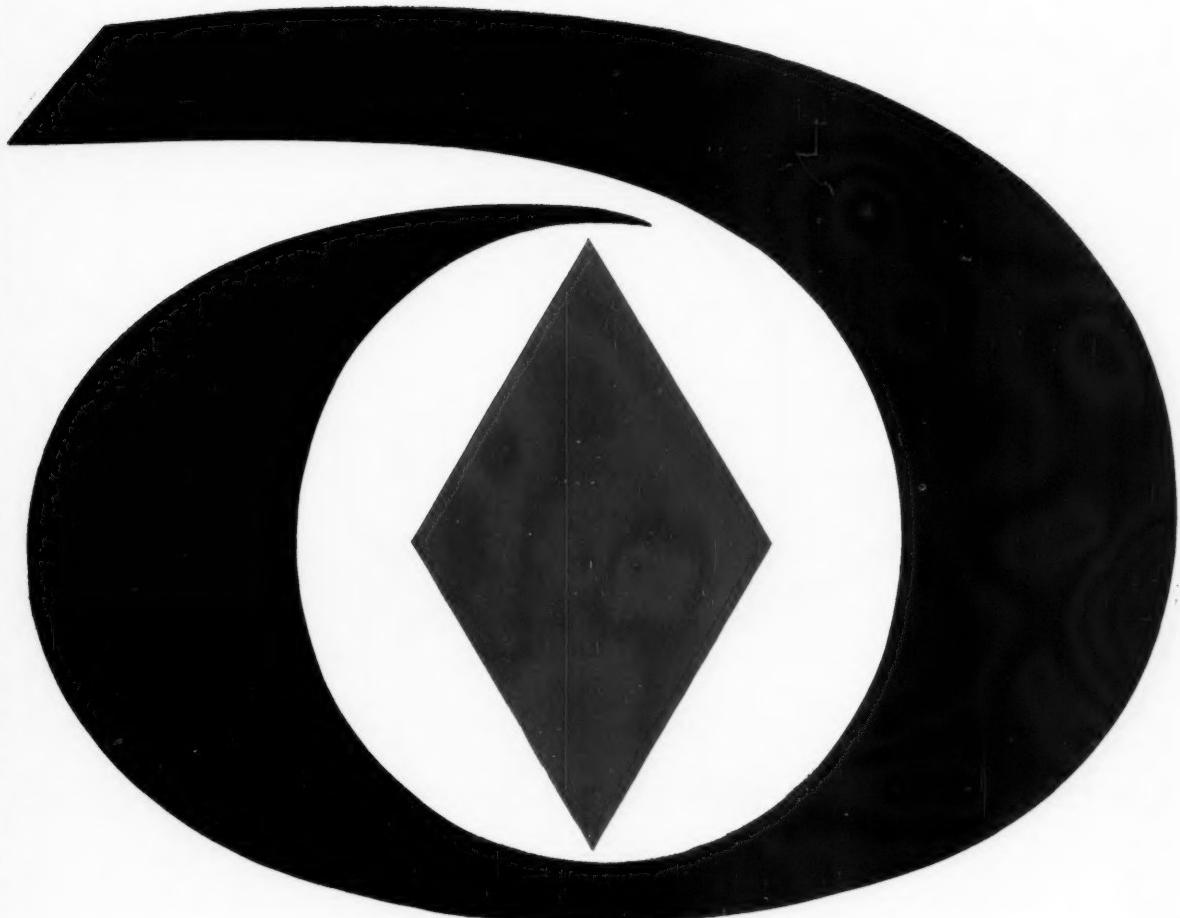
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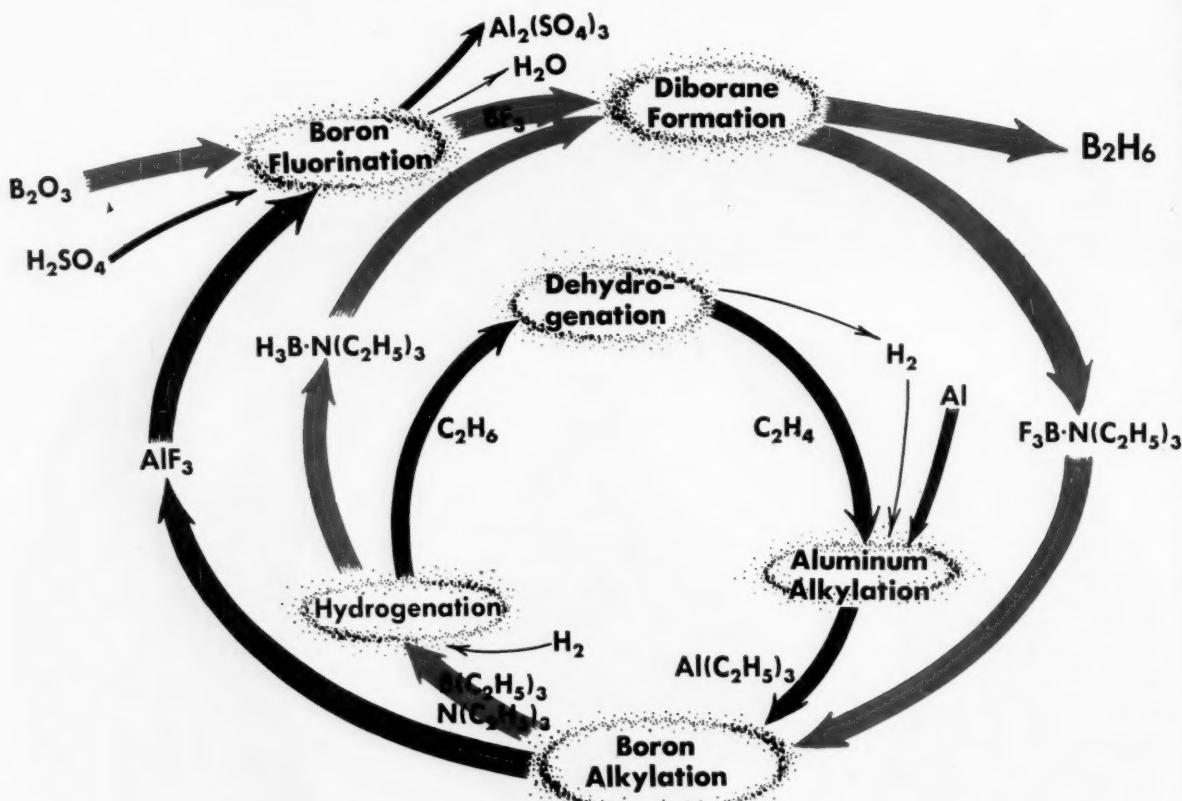


Diamond Chemicals





RESEARCH



NEW ROUTE TO DIBORANE: Process research keynotes the drive for lower-cost boron fuels.

Germany Joins the High-Energy Fuels Whirl

At least one U. S. firm and one German firm are looking into the new diborane process sketched above. So says K. Koester, the German co-inventor of the process. Koester isn't mentioning names. But, thanks to soaring interest in diborane as an intermediate for high-energy fuels (e.g., penta-, deca- and alkyl boranes), it's safe to assume that a number of other companies are potential customers for the yet-unlicensed process.

Ensconced in a small pilot plant at the Max Planck Institute for Coal Research (Muelheim-Ruhr, Germany), the process forms diborane from aluminum trifluoride, sulfuric acid, boron trioxide and N-trialkyl borazane. Only about 20 liters of the product have been made, so commercial value of the process is largely conjectural.

But its inventors, Koester and the ubiquitous Karl Ziegler, are optimistic. Even in infancy, the process offers a sharp contrast to (what is believed* to be) a major U.S. method of making diborane—reaction between boron trichloride and sodium borohydride to yield diborane and by-products.

*Because of security restrictions, very little about high-energy fuels is known for sure outside of official circles.

For the latter process, Koester has turned up a new way to make alkali metal borohydrides, too. He treats boron trialkyl compounds with a tertiary amine and gaseous hydrogen under pressure. N-trialkyl borazanes are produced.

The N-trialkyl borazane is then treated with a suspension of metal hydride powder at 100°C in an inert solvent. Result: high-purity metal boron hydride, recovered by distilling off the solvent and tertiary amine.

Koester has made boron hydrides of lithium, sodium, potassium, magnesium and calcium by the new method.

According to a leading high-energy fuels producer, Olin Mathieson, diborane can also be "conveniently" made by reacting lithium hydride with boron trifluoride etherate (*CW Technology Newsletter*, May 18). OM states that it is continuing research on routes to high-energy fuels "with the view of lowering costs and obtaining higher yields of products and conversions of reactants."

More of this kind of work will be needed if boron fuels are ever to have civilian as well as military uses.

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RESEARCH



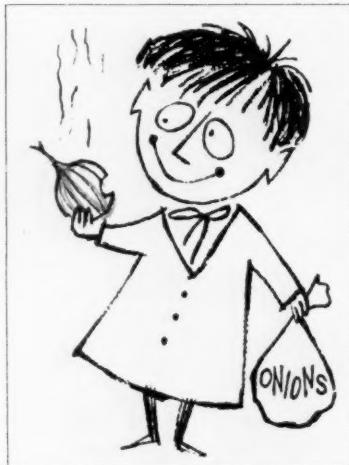
1 The creative scientist is an individualist.



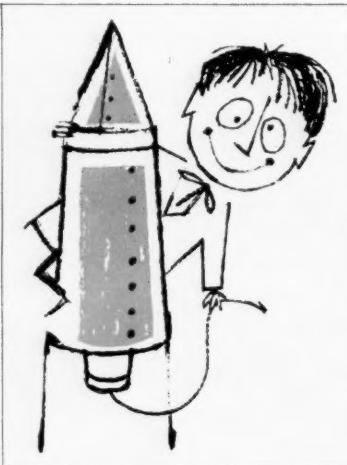
2 He is more concerned with abstract values.



3 He is devoted to long-range goals.



4 He is happy when he is working alone.



5 He likes to initiate his own activities.



6 He likes to solve problems just for the fun of it.

How to Size Up the Productive Researcher

If a researcher of yours exhibits the traits portrayed above, hold on to him—he's probably both creative and productive. That's the message implicit in a new University of Chicago study of creativity.

Conducted by John Timberlake, National Institutes of Health research fellow, and Morris Stein, associate professor of psychology, the Chicago study has turned up evidence that the creative scientist is a distinguishable personality type; he's an individualist.

Timberlake and Stein used three types of tests on 66 industrial research chemists, all Ph.D.s (employed by three companies).

Chemists tested averaged 35 years old, had all been employed by their present companies for at least two

years, and had averaged five years of experience.

Creativity of these people was determined by the number and quality of their ideas, their ability to test and communicate those ideas.

Findings are part of a long-range study (to be completed this fall) supported by the Industrial Research Institute.

Twelve of the 15 scientists pegged as individualists by Timberlake and Stein were rated highly creative by their superiors and co-workers. Only six of 23 nonindividualists were so rated.

Looms Large: The Chicago project has down-to-earth significance for industrial research management. Most research directors agree that evaluation of a

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RESEARCH

staffer is necessarily highly subjective, and that creativity is a big—though not the only—factor in such evaluation.

Monsanto's Carroll Hochwalt, vice-president for research and engineering, feels this way about it: "Monsanto employs no formal method of evaluating the productivity of research scientists, since research productivity today is largely the result of team effort (even though the team is usually sparked by an individual).

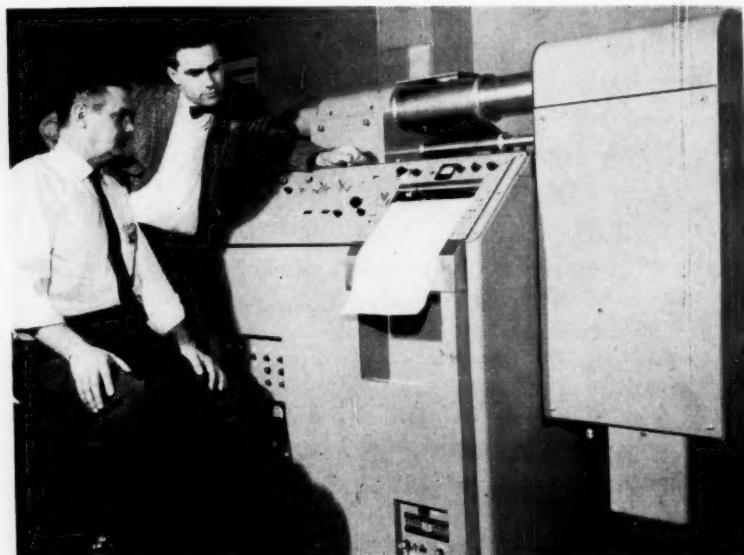
"Productivity can be evaluated only in terms of the team's progress on a given project. An individual, therefore, is rated in terms of the quality of his job performance in the team effort. Here, creativity is important, though it is difficult to measure."

Hochwalt stresses that the evaluation must be qualitative, rather than quantitative, if it is to be both meaningful and constructive. "Individuals can be evaluated only in relation to their research assignments," he says, "not in relation to norms or other individuals. No formal yardstick pos-

sibly could distinguish the greater element of productivity between, for example, the inductive thinker who synthesizes a new compound and the deductive thinker who patiently works out an important process improvement. Nor do all research scientists have, at any given time, equal opportunity to demonstrate creativity or productivity."

The informal approach to gauging productivity is widespread in the chemical process industries. Only one major firm surveyed on this subject by *CW* has reduced its appraisal to a printed check list, and even here the items (e.g., creativity, motivation, leadership, administrative skill) are subjective. One item, "job performance," asks for appraisal of quantity and quality of work, cooperativeness, cost consciousness, etc.

Problem of Definition: While creativity is a term widely used in evaluating the fitness of a researcher, there's not much unanimity on its definition. The University of Chicago study may help clear up this con-



Penning Petrochemical Patterns

Quick and accurate identification of chemical structures is the forte of this Cary Model 81 Raman spectrophotometer, newly unveiled by Applied Physics Corp. (Pasadena, Calif.). The device reportedly cuts the operating time of spectrophotom-

eters using the photographic method from six hours to 10 or 15 minutes in some cases. Now in use by California Research Corp. (San Francisco), the machine records extremely weak radiation, emitted by molecules, on a strip chart.



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Acetylations—of alcohols or amines with acetic acid, acetic anhydride or ketene to give such compounds as esters, amides and anilides. The use of acetic anhydride and ketene are particularly useful with heat-sensitive compounds.

Aldol Type Condensations—with aldehydes, ketones, or both, to give such compounds as acetaldol, butyraldol, diacetone alcohol, 2,2-bis(hydroxymethyl) butyraldehyde (trimethylolpropane intermediate), and hydroxypivaldehyde (neopentyl glycol and pantothenic acid intermediate).

Anhydride Formation—of symmetrical or mixed anhydrides by reaction of acetic anhydride with various organic acids.

Dehydrations—of aldols and ketols catalytically or thermally to give such compounds as crotonaldehyde, mesityl oxide and isobutylidene acetone.

Dehydrogenations—of primary or secondary alcohols in liquid or vapor phase reactions to give, as examples: acetaldehyde, propionaldehyde, acetone, methyl ethyl ketone, and methylhexyl ketone.

Esterifications—of solids or liquids, saturated and unsaturated, mono- or polyhydric alcohols, and mono- or polybasic acids have been esterified.

Hydrogenations—up to 2000 p.s.i.g. and 250°C. with various catalysts. Partial, selective hydrogenations of unsaturated aldehydes to saturated aldehydes such as 2-ethylhexenal to 2-ethylhexanal, and crotonaldehyde to butyraldehyde, have been carried out, along with experimental work on reducing the aldehyde group without hydrogenating the double bond, to give such compounds as allyl and crotyl alcohols. Complete reductions of aldehydes and unsaturated compounds have also been carried out to make butyl alcohol, 2-ethylhexanol, and isocaproic acid from 4-methylpentenoic acid. Hydrogenations are also valuable in up-grading materials with undesirable unsaturation or color.

Oxidations—of saturated and unsaturated aldehydes, alcohols and aromatic compounds catalytically with air to give acids containing no inorganic products other than catalysts. Examples are the preparation of acetic, butyric, 2-ethylhexanoic, crotonic, benzoic, toluic and phthalic acids.



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RESEARCH

fusion, help identify creative individuals.

A CW survey turned up such definitions of creativity as "the ability to get imaginative ideas," "getting good useful solutions of problems presented to the researchers," and "the approach and ability to adjust to a problem."

What's been needed is a guide to recognition of these idea men. With an assist from psychology, research directors should be better able to spot—and reward—such talent.

EXPANSION

- Trionics Corp. (Madison, Wis.) has set up a new research and development laboratory for contract studies in ceramics, coatings and surface treatments, radiochemistry, etc.

- Future site of Aluminum Co. of America's research and development center is a 2,000-acre tract of land near Merwin, Pa.

APPARATUS

Blood Test: Continuous analysis of a patient's blood—for drug concentrations, sugar, minerals, etc.—is possible with a new device, the Auto-analyzer. It's manufactured by the Technicon Co. (Chaucey, N. Y.), costs \$3,500, is also intended for use in antibiotic and sugar production control, etc.

Rugged Balance: Cahn Instrument Co. (Downey, Calif.) is out with a new type of microbalance. The firm says it's resistant to shock, vibration and temperature change, yet retains sensitivity and accuracy. Called the Cahn Electrobalance, it balances sample weight via torque applied by an electric current in a magnetic field.

REPORTS

- **For plastics researchers:** "Polymer Evaluation Handbook" (PB 121-870, \$3); "Performance of Glass-Fabric Sandwich and Honeycomb Cores at Elevated Temperatures" (PB 121697, 75¢).

- According to "A Sintered-Plate Nickel-Cadmium Cell" (PB 121533, 50¢), a commercially available sintered-plate secondary cell has shown considerable improvement in high-rate and low-temperature performance over the conventional cell used in the nickel-cadmium alkaline battery.



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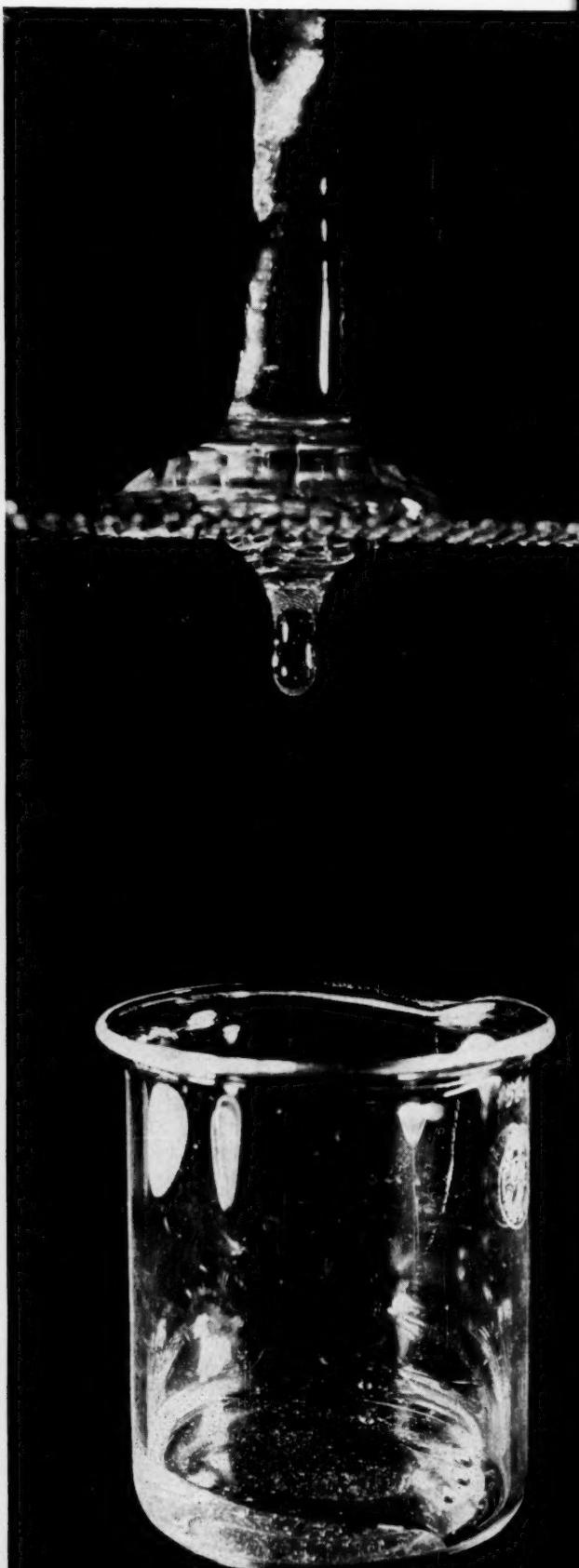
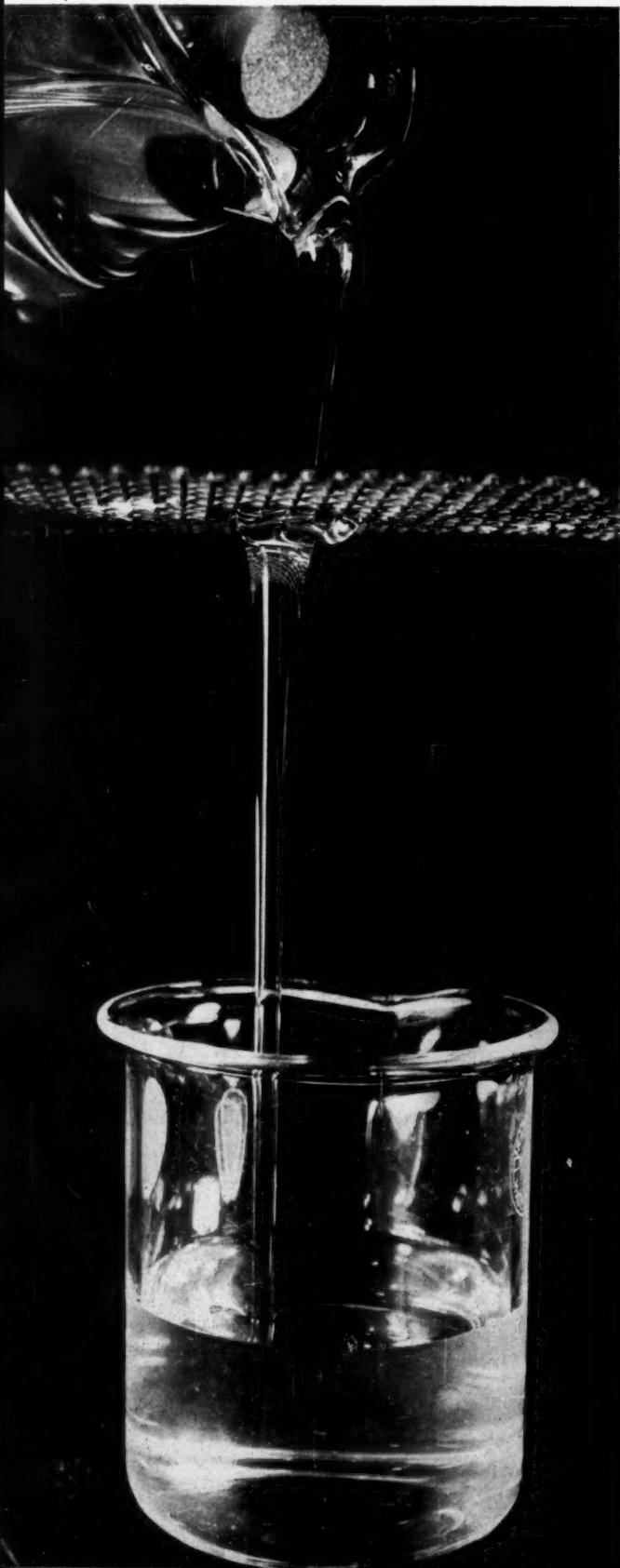
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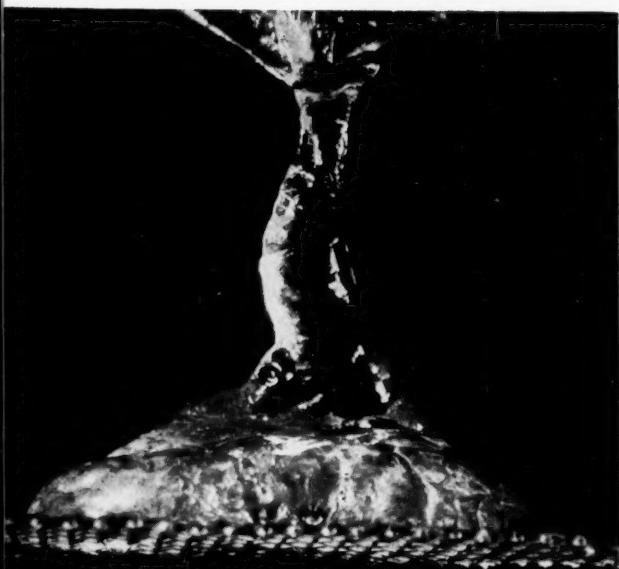


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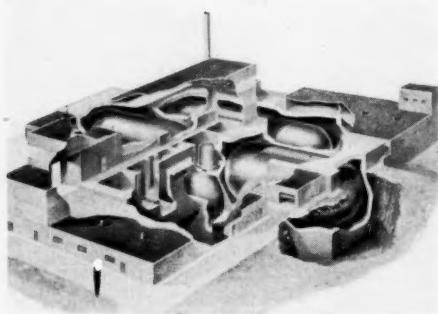
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ABOUT THE PHOTOGRAPHS . . . Bernard Hoffman, well-known science photographer, used a gamma micro camera with a Zeiss 32 mm macro tessar lens in taking these photographs. He worked at a distance of 2½ inches from the subject and shot at a speed of 1/10,000th of a second.

KEY: Extreme left: 3% CMC 70 low-viscosity. Center: 3% CMC 70 medium-viscosity. Right: 3% CMC 70 high-viscosity.

PRODUCTION



Shippingport vs. Calder Hall

Friendly Rivals in the Nuclear Power Race

Keen competitive appraisal of U.S. and Britain's rival concepts is taking place in power-hungry Europe and Japan.

Britain's gas-cooled and U.S.'s water-moderated reactors will be neck and neck in the kilowatt race, if projected scale-ups are an indication.

Though AEC-Duquesne Light Co.'s pressurized-water reactor (Shippingport, Pa.) has yet to generate its first kilowatt-hour of electrical power, it's already in competition—at least, in theory—with Britain's recently started Calder Hall station (*CW*, Oct. 20, '56, p. 74). The current interest of such power-hungry areas as Japan and the Euratom group has raised much speculation over the eventual commercial potential of pressurized-water vs. gas-cooled reactors. And, despite the differences between Shippingport and Calder Hall, a careful examination of the two systems reveals remarkable similarity in projected capabilities.

As AEC's assistant director for technical operations, Clark Goodman, pointed out last fortnight*, existing installations of the two types of reactors don't provide valid comparisons. Calder Hall, for example, is being operated not only for electrical power but also for the production of plutonium. Consequently, optimum fuel burnup is less important than it would be in a commercial plant designed for maximum efficiency in power generation alone. And since it is owned by Britain's nationalized power industry, Calder Hall enjoys certain economic advantages, such as low interest rates, that would not be available to privately owned facilities.

Shippingport, on the other hand, is primarily an

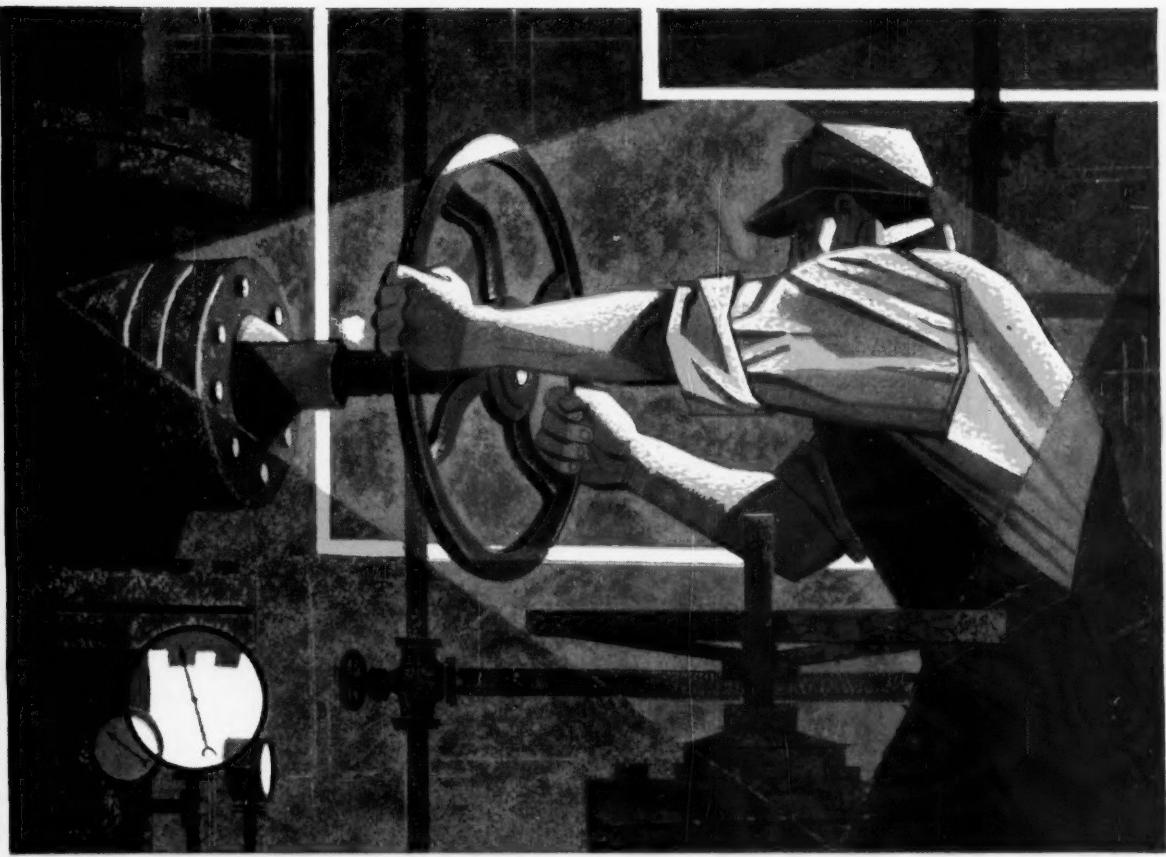
*Goodman spoke at the annual meeting of the Nuclear Energy Writers Assn.

experimental plant and, as such, is overdesigned (by commercial standards). And since it is not yet in operation, estimated fuel costs are high (*CW*, Feb. 4, '56, p. 50), probably don't reflect optimum operation.

Project Size-Up: To provide a more accurate comparison of the two systems, AEC last year commissioned American Radiator & Standard Sanitary Corp. to make an independent survey of both the technical and economic merits of each. The first of the Project Size-Up studies—a comparison of power costs for hypothetical, 90,000-kw. plants of "second generation" design—was issued last month by Dept. of Commerce's Office of Technical Services.

Conclusions drawn from the study indicate that, in the U. S., a Calder Hall-type plant could produce power for 17.9 mills/kwh. vs. 19.6 mills/kwh. for a PWR-type station. Because of lower construction costs and much lower capital charges in Britain, the comparison there would be 8 mills/kwh. for Calder Hall power, 13.1 mills/kwh. for PWR power.

The "second generation" reactors of the study are only paper plants, said Goodman, and probably will never be built. The reason: small reactors require higher capital investment (\$600-800/kw.) than do large reactors (\$400/kw.). We don't have time to build a 25,000-kw. reactor and run it for three years, said Goodman. Instead, we're forced by the kilowatt



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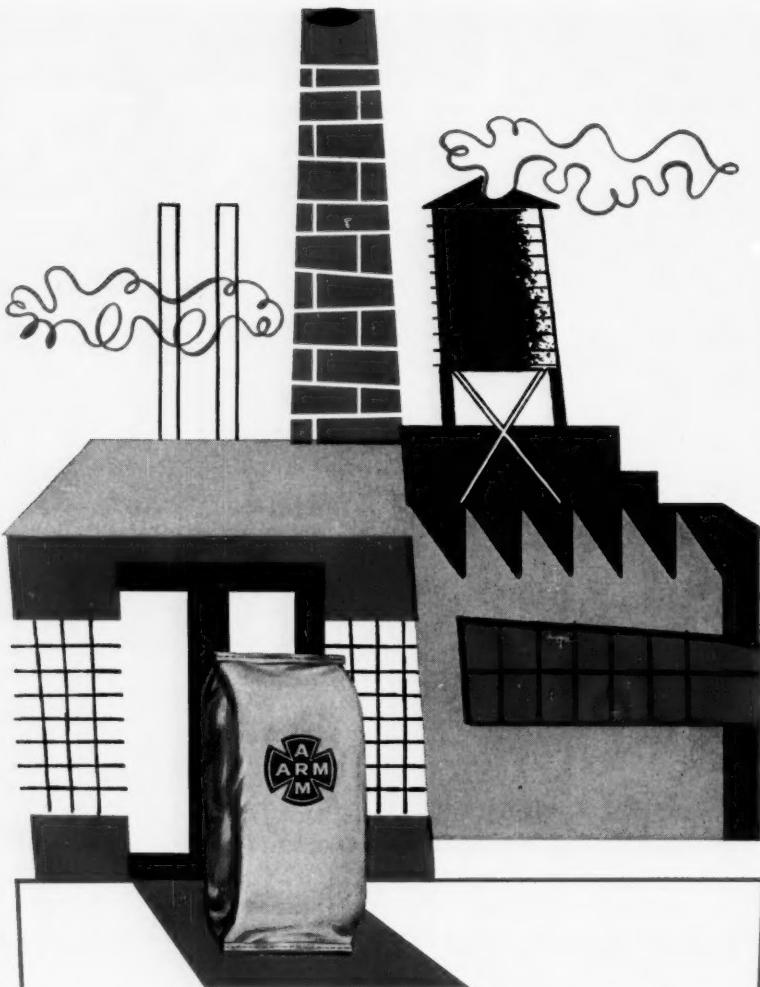
race to build big reactors in the shortest possible time.

Room to Improve: Looking ahead to "third generation" power plants there appears to be even less difference between water-moderated (both PWR and boiling-water reactor systems) and gas-cooled reactor costs. Projected power costs of large-size plants, such as those being considered by Euratom, are about the same for Calder Hall-type plants as for water-moderated systems. On the basis of nonnationalized power, the cost attainable by 1967 is 11-14 mills/kwh. This figure includes a base cost of 11 mills plus a 25% contingency.

From the standpoint of potential cost reductions, the PWR appears to be in a much more favorable position than the Calder Hall system. For one thing, Project Size-Up cites the conservative design of the PWR core, estimates that heat fluxes of 2-3 times the design values may be ultimately attainable. Calder Hall, on the other hand, is close to the upper temperature limits of magnesium cladding and uranium, probably could not increase heat flux without fairly extensive modification of fuel elements. (Fuel trouble has already caused partial shutdown of Calder Hall; c.f., CW Technology Newsletter, Feb. 16).

Two-Way Opportunity: Aside from political significance, U.S. participation in Europe's nuclear power program will be a two-way street for nuclear technology. Nuclear power—even at 11-14 mills/kwh—is competitive with 10-mill power generated from Europe's dwindling coal and precarious oil supplies. Cooperative ventures with European companies will repay U.S. firms in a feedback of experience gained at a profitable operating level.

But there are still some problems to overcome. For example, it would be impossible, said Goodman, to produce 30 pressure vessels in the next 10 years with present facilities. And information exchange is still a very complex—though no longer a very serious—problem. The biggest question now, said Goodman, is, Can the six European countries get their own political houses in order? If and when they do, it will be up to American industry to do its best to capitalize on its present lead in nuclear know-how.



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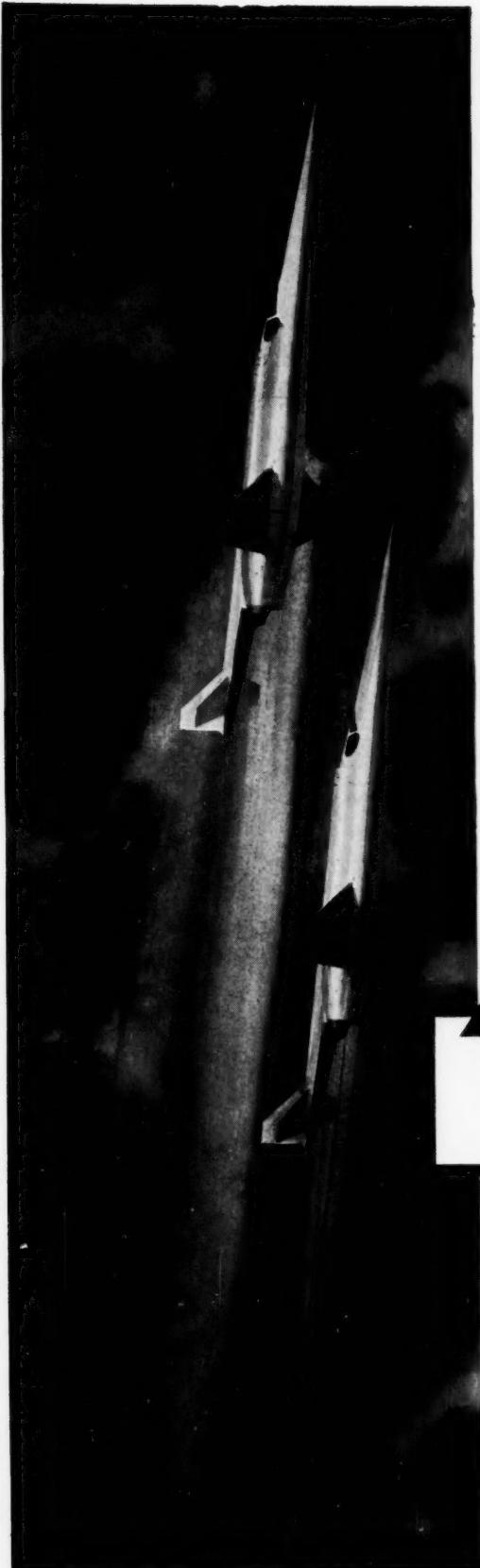
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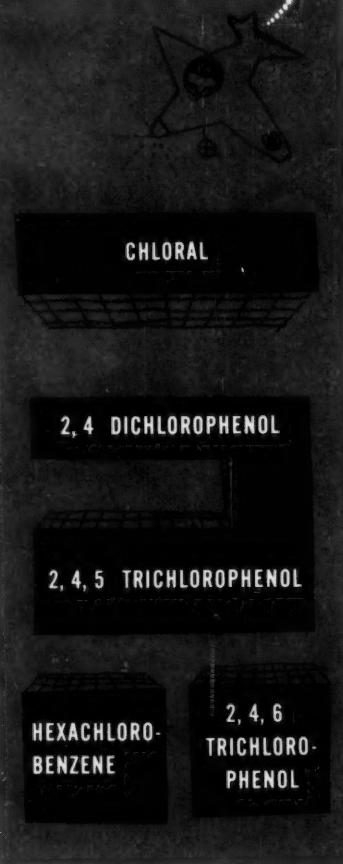
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Oilmen Talk Instruments

For some 1,500 petroleum processors at the American Petroleum Institute's Division of Refining meeting in Philadelphia last week, there was plenty of interest in the reports on corrosion, air pollution, gasoline upgrading, new isomerization processes and other processing developments.

But for the majority of chemical and petrochemical processors at the 22nd midyear meeting, one of the brightest highlights of the 11 technical sessions was the report on the petroleum industry's experience with new types of instrumentation.

Pollution Detective: At the Tuesday session on pollution, William Scott, chief of Franklin Institute's (Philadelphia) chemical kinetics and spectroscopy section, described the unique contribution to the basic understanding of air pollution that has been made by a new type of analytical instrument. Dubbed "Silent Sam," the FI-developed device is an infrared absorption cell and spectrometer designed to isolate and identify air pollutants at concentrations as low as 5 ppm.

In the laboratory, "Sam" enabled FI scientists to isolate a mysterious compound X—believed to be a contributor to smog formation—and to identify it as peroxyacetyl nitrite. A mobile "Sam" has been used for on-the-scene studies of pollution in the smog-prone Los Angeles area, has done much to advance theories of air-pollution chemistry.

Operational Aids: Because the petroleum industry stands to gain a lot from instrumentation and automation of its many complex, interrelated processing operations, petroleum processors have been prominent among the leading proponents of computer control and automatic data logging systems. Chemical processors were therefore particularly interested to hear what the oilmen had to say at Wednesday's session on instrumentation.

A three-part progress report on data logging brought out several of the operating difficulties and many of the economic problems that management men must consider before acquiring data logging equipment.

Standard Oil of Ohio's Emil Ebner described three data logging systems

installed by Sohio in the past year and a half. Of the three, said Ebner, only one has measured up to performance expectations. That one is a system built by Fischer & Porter Co. (Hatboro, Pa.) to log 180 pneumatic and electrical analogs of temperature, pressure, flow rate and liquid level in digital form. Installed at Sohio's process and product development lab, the logger records data for two pilot-plant units, has required an average of only 30 minutes/day of preventive maintenance to keep in operation 95% of the time.

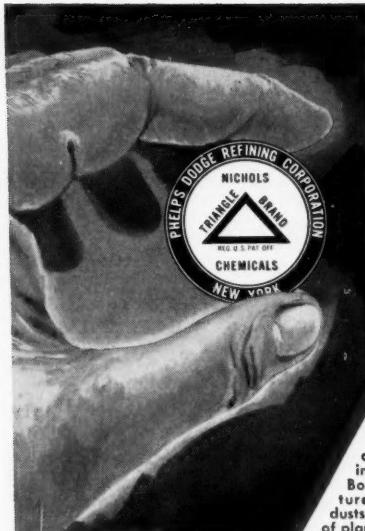
The other systems, said Ebner, have not been so successful. The first was selected for Sohio's steam-methane synthesis of ammonia, which, the company believed, was sufficiently understood to lend itself to automatic computer control. The logger's job: the rapid accumulation of accurate data—during normal operating periods as well as during upsets—required to optimize both the quality and the quantity of a product. Although difficulty with the logger's complicated electronic circuitry required the services of a factory technician about half time during its first year in the ammonia plant, said Ebner, the company believes that the equipment should attain the anticipated 90% service factor in the near future.

Similar difficulties plagued Sohio's third data-logging system installed as an off-normal temperature scanner on an Ultraformer. Designed to scan 200 temperature points at the rate of 5 points/second, the scanner proved to be more of a nuisance than an operating aid. Temperature swings were too drastic, said Ebner, to permit setting the high- and low-alarm limits as closely as needed for normal operation; rapid scanning kept the alarms ringing most of the time. Sohio has requested the manufacturer to redesign the system to print all temperatures on demand, will later convert it to a true automatic data logger.

Based on these experiences, Sohio concludes:

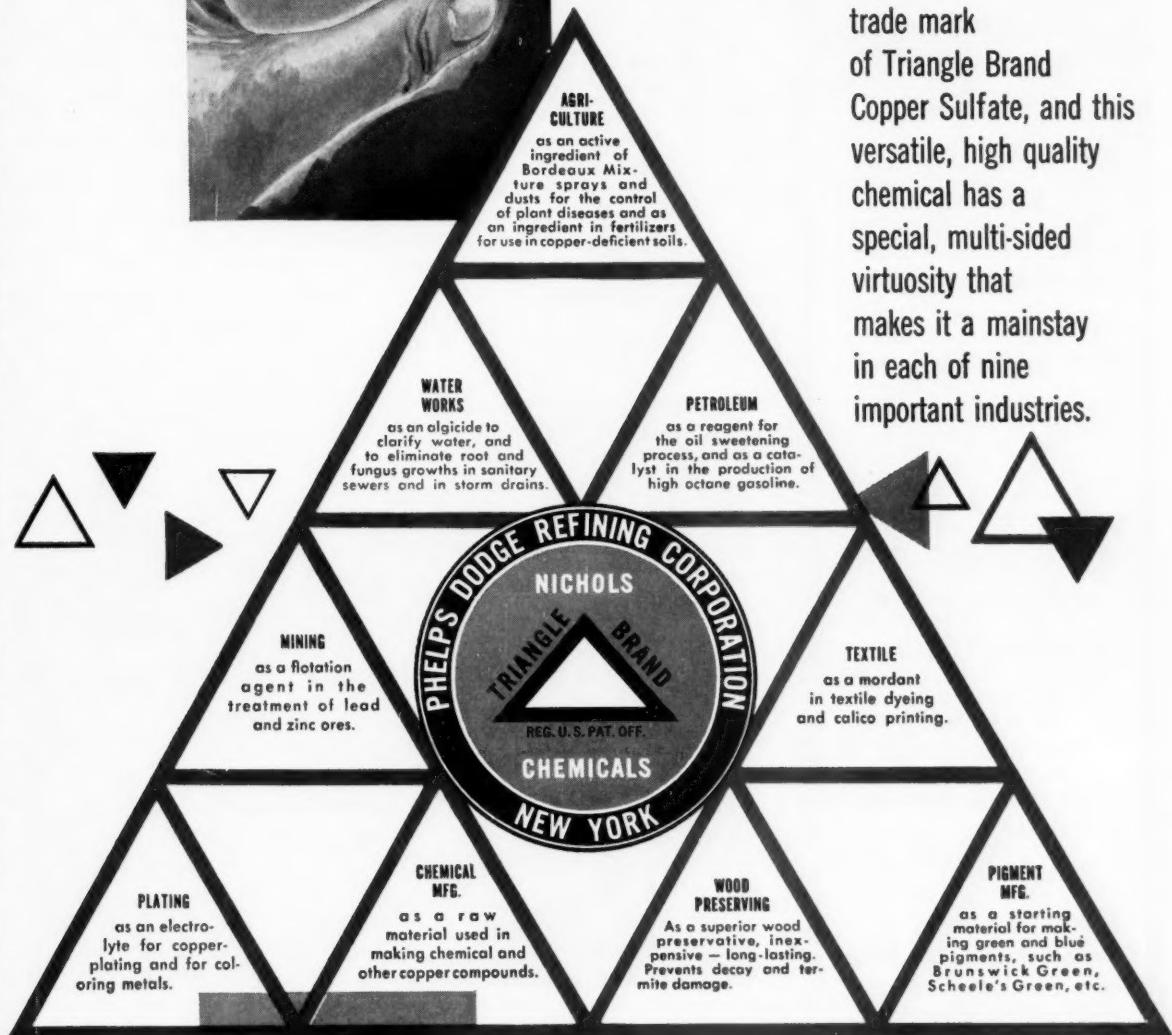
- Manufacturers must design and build more reliable equipment.
- The simpler the system, the better its service factor will be. Dual-purpose systems should employ separate electrical circuits to minimize

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the effects of a component failure.

• Off-normal scanning is of doubtful value as an operating aid; high-speed operation causes rapid wear, reduces reliability.

• For reliability reasons, it's not advisable to reduce the number of panel-board recorders as justification for data logging.

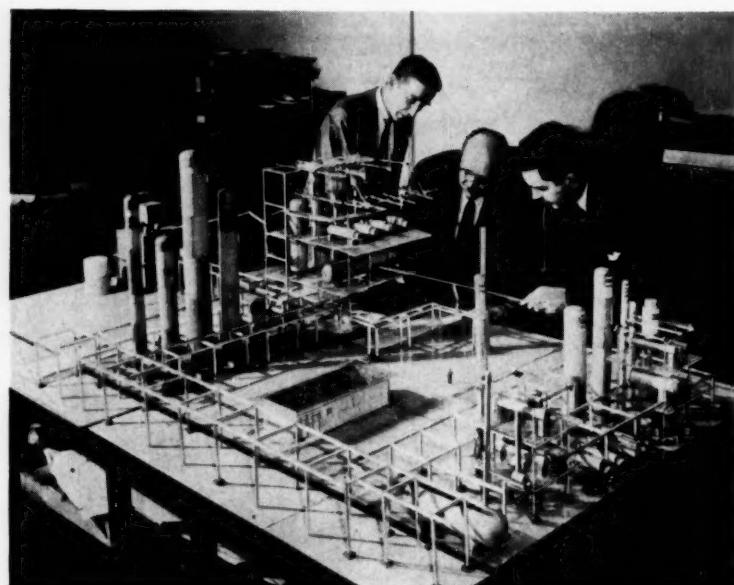
• Maintenance costs are high; loggers require specially skilled instrument personnel to provide proper maintenance.

Justification and Acceptance: Somewhat at odds with these views on scanners, was the experience reported by Tidewater Oil Co.'s James McDonald. Scanning devices installed last December at Tidewater's new Delaware refinery, said McDonald, have worked well. It now appears, he added, that all units should be fairly well installed and debugged by July.

Tidewater's really big problem: getting the operators to utilize the systems

to the fullest extent. Having started the refinery units without scanning and logging, the operators are inclined to view the new-fangled instruments with suspicion. To overcome this attitude, Tidewater plans to launch an intensive training program to sell the operators on the scanning and logging systems, which, the company is convinced, are here to stay.

In closing the data logging panel, E. C. MacMullan of Esso's Bayway refinery stressed the problems of economic justification. It seems likely, said MacMullan, that many loggers can't be justified solely on process manpower savings. Reduction of accounting work load and control room investment credits—though real—are small; accuracy of automatically logged data is an intangible benefit. In view of these considerations, said MacMullan, it's Esso's conclusion that each logger must be justified individually as to its location and function.



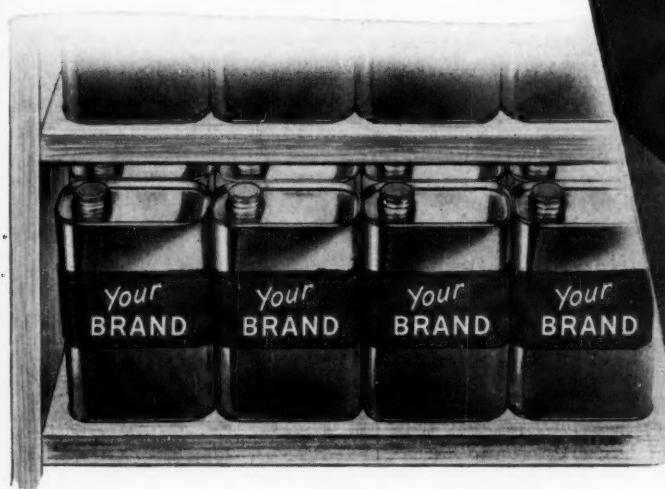
Preview of a Process Debut

With addition of three 60-million-lbs./year plants, direct oxidation is getting ready to lengthen its lead over the chlorohydrin process of making ethylene oxide (*CW, March 10, '56, p. 38*). All three plants—Wyandotte Chemicals Corp.'s (modeled above) Geismar, La., unit, Calcasieu Chemical Corp.'s Lake Charles, La., plant, and Petroleum

Chemicals, Ltd.'s Partington, England, installation—are being built by The Lummus Co. (New York), will use Shell Development Co.'s process. Although the route has been thoroughly tested in pilot plants, the trio will be the first commercial applications of Shell's method of reacting ethylene with oxygen over a silver catalyst in a fixed-bed reactor.

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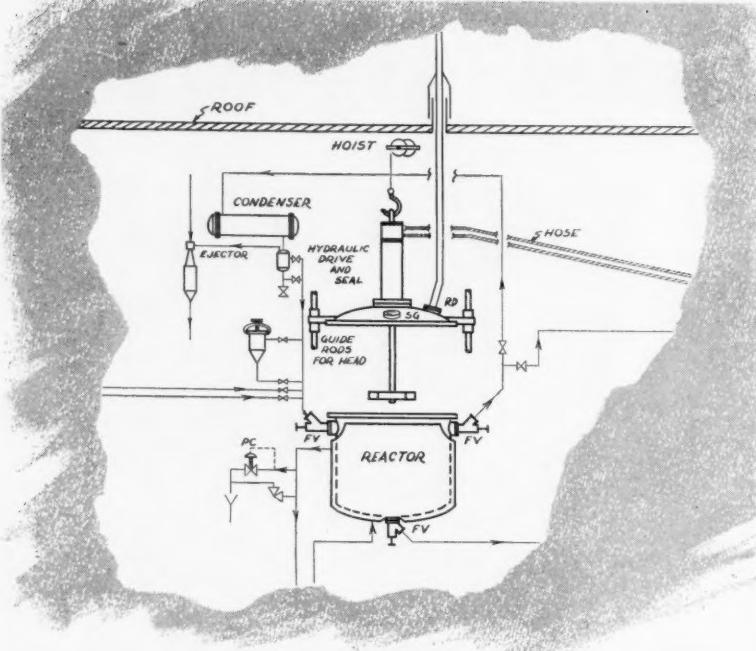
EQUIPMENT

Pneumatic Controller: Taylor Instrument Companies (Rochester, N.Y.) says its new Transcope pneumatic controller provides an accurate means of maintaining a given set-point for varying time constants and short-span measurement by relaying measured variables to a final control element (e.g., diaphragm valve, lever motor) for corrective action. The compact (6 x 6 x 4½ in.) controller uses the motion-balance principle, has low air-consumption rate, is highly unresponsive to ambient temperature.

Converter-Relay: The LIAD, a new control instrument offered by Assembly Products, Inc. (Chesterland, O.), functions as an analog-to-digital converter and as a multicontact meter relay. For telemetering, automatic testing, multigrade sorting, reading of maximum values and accumulating statistical quality-control data, the unit has moderately accurate digital readout. LIAD will initiate simple control action at a number of signal points. The unit operates on small signals from sensing elements such as thermocouples, ion gauges, strain gauges, differential transformers, photocells, bridge circuits.

Explosion Meter: Atlas Laboratories, Inc. (Houston, Tex.), is out with a new portable instrument for measurement of explosive gases. Tagged model 504, the unit operates on a 2-volt storage battery, registers gas concentration on direct-reading scale. The meter is factory-calibrated for methane and ethane, can be calibrated for other gases if desired.

Shredded-Metal Packing: For extremely high steam pressures and temperatures (to 1500 F), Garlock Packing Co. (Palmyra, N.Y.) offers two new shredded metal packings—styles 934 and 935. Both are made of copper tinsel treated with special rubber cements, graphited throughout. Style 934 comes in ring form, is molded to a square cross-section and bevel cut; 935 is a packing set, with conical-shaped molded center rings and bronze top and bottom adapters. Garlock recommends both for steam, air, water and gas (except ammonia) service on valve stems, reciprocating rods and rotary shafts.



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U.S.I. CHEMICAL NEWS

May 25 ★

A Series for Chemists and Executives of the Solvents and Chemical Consuming Industries

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New Polyethylene Bottle Has Built-In Sterilization

A manufacturer has introduced a self-sterilizing polyethylene bottle in which a permanent type antiseptic is incorporated in the resin at the time it's molded. The product seems to be an effective answer to an old problem: how to sterilize a polyethylene container without subjecting it to high heat.

Self-sterilization by chemical means is not new, having been used for a number of years in textiles, leather and plastics. However, the new polyethylene bottles are believed to represent the first successful use of the principle in this field. Until now, polyethylene bottles which required sterilization have been irradiated, a costly process that offers less permanent protection than many chemical antiseptics.

In the new product, a liquid germ-killer (nature not disclosed), is added to the polyethylene as it goes into the mold. As little as one gallon is claimed to render 5,000 lbs. of resin self-sterilizing for an indefinitely long time.

The new bottles are expected to find wide acceptance in the drug and pharmaceutical fields.

Methionine Plays Role In Adrenal Gland Function

A recent study reports evidence that methionine is beneficial to Vitamin C metabolism and to the functioning of the adrenal glands.

It was found that methionine increased the Vitamin C content of the adrenal gland in experimental animals. A high level of Vitamin C in the adrenals is known to help these glands function better. Vitamin C is necessary for the utilization of the adrenal cortex hormones, especially for the salt metabolism they control.

Of three sulfur-containing amino acids studied, only methionine had this effect.

U.S.I. and Mallory-Sharon Form New Subsidiary to Melt and Fabricate Zirconium

Reactive Metals, Inc. Will Concentrate on Ingots and Mill Products to Help Speed Growth of Zirconium Industry

Formation of Reactive Metals, Inc., a joint enterprise of U.S.I.-National Distillers and Mallory-Sharon Titanium Corp., marks another step in the evolution of zirconium from a specialty business into a full-fledged commercial industry. For the present, the new company will melt zirconium and its alloys and will manufacture zirconium mill products. Production will be expanded soon to include hafnium, and later to include other metals of value to the atomic energy program.

New ingot melting facilities will be constructed at Ashtabula, Ohio, site of U.S.I.-National Distillers' new zirconium sponge plant. Auxiliary facilities will be provided to insure production of sound ingots, both alloyed and unalloyed, ready for fabrication to any type of product. Mallory-Sharon's years of experience in melting and fabrication of titanium will be utilized to the fullest extent.

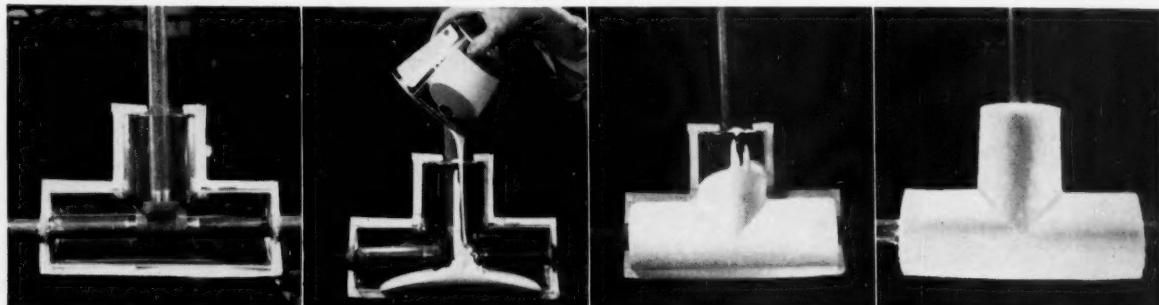
Will Ease Supply Situation

Formation of the new subsidiary will make it possible for users to buy zirconium sponge or platelets from U.S.I.-National Distillers, or finished ingots, billets or mill products from Reactive Metals at firm prices with firm delivery dates.

Common sizes of ingots and billets will be carried in stock. This will greatly reduce existing procurement delays. U.S.I.-National Distillers has lowered the price of zirconium sponge considerably through technical advances, but the company feels that similar progress must be made in melting and fabrication before zirconium

MORE

Pipe Joint Gets Urethane Foam Insulation In Place



Versatile urethane foam is formed on the job, makes insulating easy. Transparent mold is set up around pipe joint. After mixing polyisocyanate with polyester, mix is poured into mold. U.S.I. ISOSEBACIC Acid can be used as intermediate for polyester component.

Urethane polymer is formed by mixing of the two chemical components and carbon dioxide gas is given off during reaction, causing polymer to foam in place. Polyurethane foam hardens almost at once, and mold is removed. Photos courtesy Nopco Chemical Company.

May 25 ★

★

1957

U.S.I. CHEMICAL NEWS

New U.S.I. Booklet Updates Information on Sodium Dispersions

A new 44-page technical bulletin just released by U.S.I. contains much new information on techniques and equipment for using sodium dispersions in pilot plant and full scale reactions. U.S.I., a pioneer in the development of sodium dispersions and their adaptation to commercial use, was the first to present to the chemical industry a technical bulletin on this interesting branch of sodium chemistry.

The new publication describes the most recent advances in engineering techniques and equipment to achieve higher yields and reaction rates, improved reaction control, economy of reagents and new uses of sodium dispersions. Methods for converting liquid sodium

CONTINUED ➤ Subsidiary

can fulfill its proper role in the metals and chemical industries. This purpose is to be served by the new jointly owned subsidiary. Backed by the technical and financial resources of the parent companies, it will devote its efforts solely to the processing of zirconium and other reactive metals.

to dispersion form on a commercial scale are discussed, as are continuous processes.

Sodium dispersions and high surface sodium (sodium-coated particles) are two forms of metallic sodium with a tremendous amount of active surface area. These forms give sodium greater usefulness in a growing number of chemical reactions.

The comprehensive new technical bulletin, "Sodium Dispersions", is available on request from U.S.I.

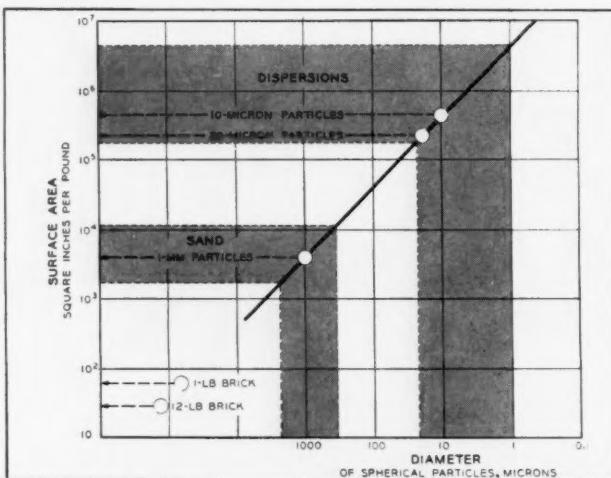


Chart reproduced from booklet shows available surface areas for reaction of several forms of metallic sodium. Dispersions offer about 100 times as much area as sodium sand and about 10,000 times as much area as uncut sodium bricks. High-surface sodium (sodium-coated particles) can offer even more surface area per pound of sodium.

TECHNICAL DEVELOPMENTS

Information about manufacturers of these items may be obtained by writing the Editor, U.S.I. Chemical News.

Non-toxic developer for blueprints is said to combine advantages of potassium or hydrogen peroxide with these additional features: does not clog drains; washing after development may be omitted; excellent recovery from fading. **No. 1230**

New technical data sheets on trimethyl and triethyl aluminum have just been published. Both compounds are used as fuel igniters in ram and turbojet engines, as polymerization catalysts and intermediates. **No. 1231**

An atomic flashlight said to provide light for many years without the aid of batteries or external power sources has been developed. It uses an essentially non-hazardous radioactive-isotope. Can be made in many sizes and shapes. **No. 1232**

Over 50 reactions of fatty alcohols are described in detail in a new 16-page brochure. Technical data on unsaturated aliphatic and saturated aliphatic alcohols are given, and the bibliography cites 70 references. **No. 1233**

Polyethylene pipe with ribs that protect the wall and increase its resistance to burst is now being fabricated. The closely spaced ribs extending lengthwise of the pipe are also said to facilitate stacking of coils. **No. 1234**

Pigment Extenders, Flatting Agents and Filler Aids are discussed in a brochure which also contains many formulas for solvent and water-thinned paints. Each formula is on a separate sheet for easy removal and binding. **No. 1235**

Nitrogen-15 enriched to 95% is now available in a number of reagent chemicals. This important tracer isotope has not been previously available in higher than 60% purity. **No. 1236**

Sodium tetraphenylboron, a popular reagent for potassium determinations, is now offered as a high-purity reagent with individual lot analyses. The compound has a minimum assay of 99.5%. **No. 1237**

Isotope Boron-10, until recently restricted to AEC requirements, is now available in kilogram amounts for civilian use. The material, which resembles powdered graphite, is valued at nearly three times the price of refined gold. **No. 1238**

A de-watering press embodying new and novel features has passed pilot model tests and is available in commercial models. It is said to embody all advantages of a hydraulic press, yet is continuous in operation. **No. 1239**

PRODUCTS OF U.S.I.

METALS

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Zirconium Sponge and Platelets
Hafnium Sponge and Oxide

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Animal Feed Products: Calcium Pantothenate, Choline Chloride Products, Curby B-G® 80, Special Liquid Curby®, DL-Methionine, Niacin USP, Riboflavin Concentrates, Vitamin B₁₂ and Antibiotic Feed Supplements, Vacotone® 40, Vitamins A, D₃ and K₃ Products, Antioxidant (BHT) Products, Special Mixes.

Pharmaceutical Products: DL-Methionine, N-Acetyl-DL-Methionine, Riboflavin USP, Urethan USP, Intermediates.

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Division of National Distillers Products Corporation
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Technology Newsletter

CHEMICAL WEEK
May 25, 1957

Credit for the first commercial polycarbonate goes to Germany's Farbenfabriken Bayer. The new plastic (*CW Technology Newsletter*, March 30; *CW*, April 6, p. 96) is being offered as foil for electrical insulating purposes. Named DO 202, the foil resists prolonged heating to 130-140 C, doesn't split off any corrosive constituents at even higher temperatures.

A new type of porous carbon, derived from coal, was unveiled last week by Great Lakes Carbon Co. (Morton Grove, Ill.) at the 1957 Coal Convention and Exposition of the American Mining Congress. Called Nerex, the product is made by a new process (Great Lakes has applied for patents but isn't ready to give details) that gets rid of all volatile matter, leaving a very porous structure. The product is described as less finely divided than lamp black carbon. It's said to be closely related to the carbonaceous filter aid that Great Lakes has produced for some time.

Nerex was developed primarily for coal mining operations. It is saturated with liquid oxygen to provide a safe, but very powerful, explosive. In tests at strip pits of Enos Coal Mining Co. (Oakland City, Ind.), says Great Lakes, Nerex-liquid oxygen explosive has proved safer to handle, cheaper to use than conventional lamp black-oxygen mixtures.

Titanium carbide can now be deposited in a thin layer on steel by a new plating procedure of Metallgesellschaft AG. (Frankfort, Germany). Though its extreme hardness and resistance to chemicals and high temperatures make titanium a natural for the protection of steel exposed to strong friction forces, its high melting point (3200 C) makes it difficult to apply without changing the physical properties of the steel.

The method developed by Metallgesellschaft is a modification of a technique devised by Prof. A. E. VanArkel of Leiden University (Netherlands). Essentially, it's a reaction of titanium tetrachloride with hydrogen and a hydrocarbon to produce titanium carbide, hydrochloric acid and another hydrocarbon. But where VanArkel used temperatures of 1000-1400 C, Metallgesellschaft makes the reaction go at 950 C, at which temperature the steel may be vapor-plated without loss of strength.

Keys to the new process are: (1) the specific catalyst used; (2) the proportioning of hydrocarbon and hydrogen, according to the carbon equilibrium at reaction temperature, to prevent formation of free carbon. Resulting layer of titanium carbide is about 20 microns thick, says Metallgesellschaft, is more wear-resistant, but costs no more than hard chrome plating.

An unusual batch of steel has been made by Armco Steel at its Sheffield Division (Houston)—the experimental batch was made from

Technology

Newsletter

(Continued)

sponge iron. Armco—like a number of other steel companies—has had a long-standing interest in methods of making iron by direct reduction of the ore. It is, in fact, operating a small direct-reduction pilot plant at its research center in Middletown, O.

But the iron for its experimental steel was furnished by Julius Madaras, who is running a pilot plant at Longview, Tex. Madaras made the iron from Venezuelan ore. Not much is known about Madaras' work, but money for it is reportedly coming from Texas millionaire Clint Murchison, among others.

The steel is now undergoing tests by Sheffield. J. H. Junengling, vice-president in charge of the division, points out that it will take time for the results to be properly evaluated.

A fat \$10 million is going into a study of control of fusion as a source of power. The money is being put up by 11 Texas utilities; the work will be carried out by the General Atomics Division of General Dynamics.

On April 1, the Atomic Energy Commission called a controlled-fusion reaction "no longer in the stage of wishful thinking." AEC Chairman Strauss revealed that a large experimental device would be built at Princeton to study control of the reaction. The body of expert opinion has been that practical, commercial control of fusion was anywhere from 20 to 50 years distant. The \$10 million could conceivably shorten that span.

Shawinigan's electrolytic titanium process needs more research. That's what the company said last week as it revealed that it was closing down its titanium pilot plant. The process (*CW, Sept. 18, '54, p. 86*) won some attention three years ago, when Shawinigan saw it as a means of solving then-existing problems. But it has had some trouble turning out a product that meets today's standards. Also, the company points out, the price of titanium has come down drastically in that period, thereby shaving the profit potential of commercial production.

A water-thinned latex paint that also has a high-gloss has been developed by Celanese. It's an emulsion of polyvinyl acetate. The secret: choice of wetting agents and protective colloids, and very fine particles. Although it does not produce paints itself, Celanese sells emulsions to the paint industry.

Idea for you? Boeing Airplane's program for utilizing college students as part-time draftsmen has worked out so well that Boeing has decided to extend it. The firm has been hiring the students on a part-time basis in its office; now has leased a building on the University of Washington campus, plans a similar setup at the University of Seattle.



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Chemical

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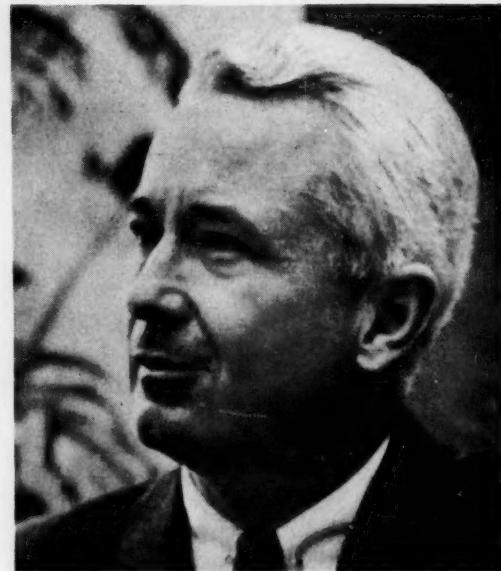
**General
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S A L E S AND DISTRIBUTION

Congress's economizing . . . Draws fire from industry.



Rep. Clarence Cannon, (D., Mo.): 'You have to be tough when you're handling the taxpayers' money.'



MCA's John L. Gillis: 'Eliminating all funds from the industry division of BDSA goes beyond budget economy.'*

Budget Cuts Threaten Business Data

Drastic cutbacks in the Administration's budget for various statistical services is arousing pronounced concern in the chemical and allied industries that use government facts-gathering agencies. Most federal statistical programs will be kept at present levels, and several are expected to be cut back.

That's the picture emerging from Congressional action on most money bills. The House has already voted on funds for a number of statistics-gathering agencies, but most businessmen feel that these amounts, when measured against the needed improvements, are not sufficient. These bills are now being debated before the Senate Appropriations Subcommittee. In public hearings last fortnight, chemical industry spokesmen strongly voiced their dissatisfaction over any cutbacks of financial aid to the government's figure-finding agencies.

The Manufacturing Chemists Assn. appeal to the Senate helped restore most of the \$3.5 million whacked by the House from the original \$7 million sought by Business & Defense Services Administration.

The Appropriations Subcommittee took heed of commerce and business spokesmen and recommended that the Senate give BDSA \$5,682,000. That's an increase of \$2,167,000 over what the House approved, but short about \$1.4 million of what Secretary Weeks

wanted. The Senate committee said it was approving the additional amounts "to make possible the continuance of the Industry Division at what is believed to be a reasonable and adequate level for the mobilization planning and business services."

Meanwhile, Commerce officials say privately that they're bound to be hit hard, even if the final figure should turn out to be what the Senate committee has approved. This budget cut means releasing more than 100 Industry Division personnel.

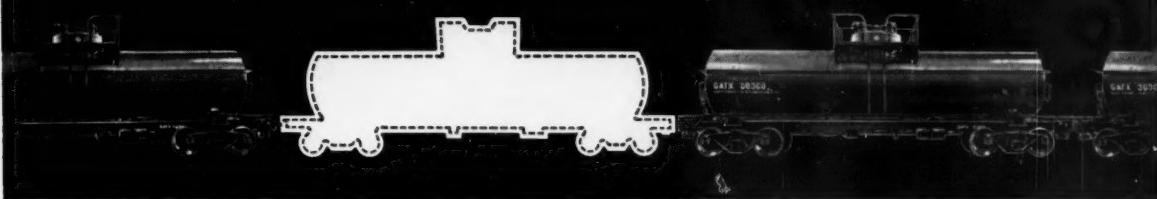
Sales and production executives were hoping to prevent any cutbacks in the service of these important bureaus. The Chemical & Rubber Division's statistics have become barometers to those in the industry who use them to gauge their own activities.

Besides gathering monthly rubber-consumption statistics—more comprehensive than anything provided by industry groups—the divisions interpret long-range supply-and-demand studies, which are usually undertaken as part of the government's defense-planning activities. These results are quickly made available to industry.

The division's market researchers continually pull together, from a variety of government and private sources, the published data relating to chemicals, and

*From a statement by the board of MCA.

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SALES

interpret this data for the chemical industries.

Because of this valuable and important service, spokesmen for the chemical and allied industries were quick to voice a strong appeal to the appropriation committee to avoid heavy, hindering cutbacks.

This strong backing by industry did much to swing the decision to restore a major part of the BDSA cut, enough to prevent a sharp reduction in activities next year. But, to continue these services under a smaller budget, BDSA probably will merge its smaller industry divisions and take steps to reduce administrative overhead.

There's almost no chance, however, of BDSA getting the \$200,000 increase it sought to begin a major overhauling and updating of data gathered during the Korean War. It requested the money to explore new methods of doing the job without burdening industry with heavy paperwork, and at a minimum cost to the government.

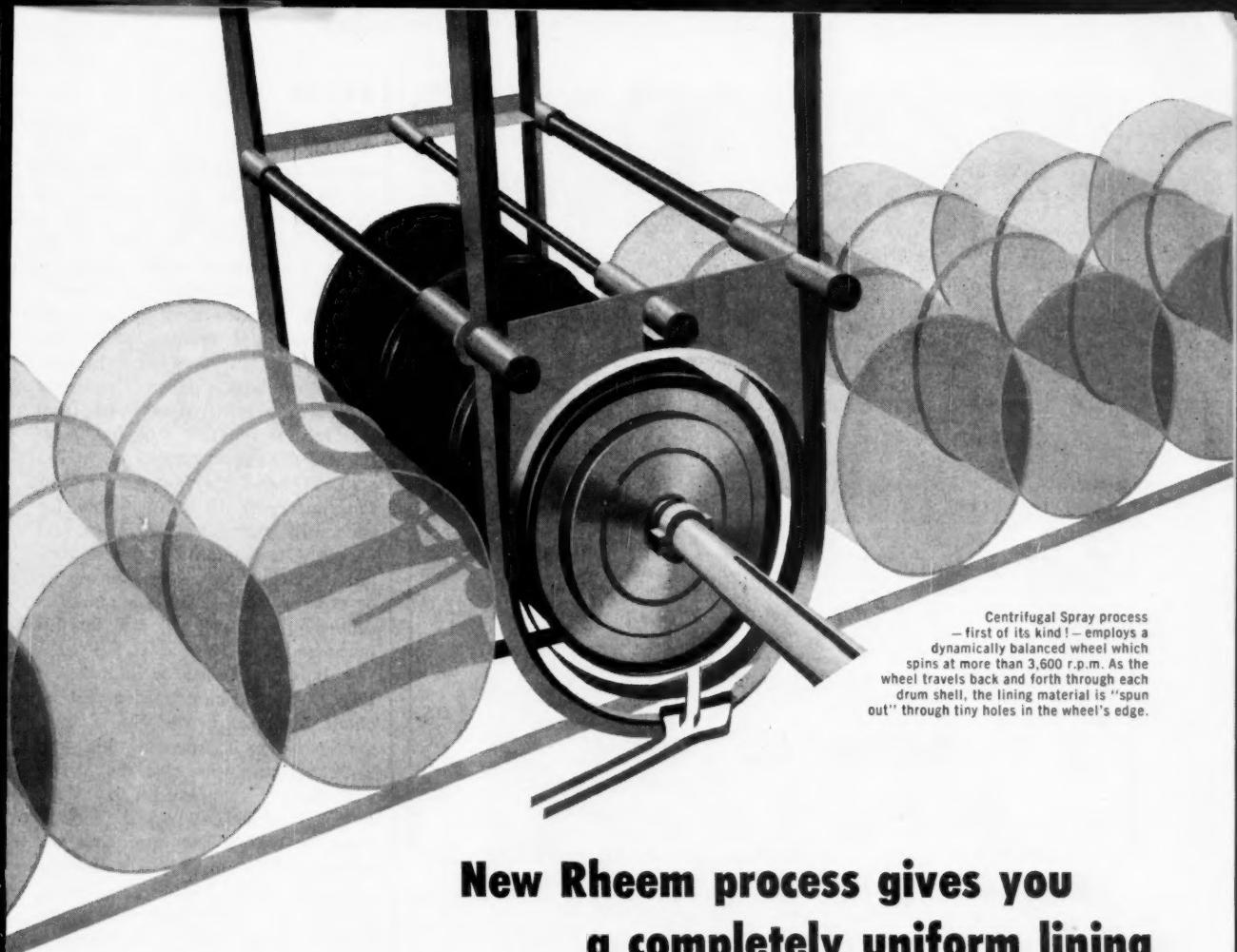
Axe Targets: Other federal statistics programs that directly or indirectly affect the chemical and allied industries may also face some whittling. Here's the outlook:

- Office of Business Economics (Commerce Dept.): the House voted



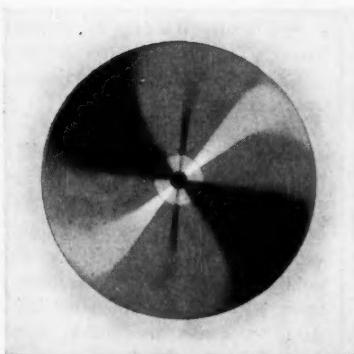
Paying for Polyethylene Protection

Large bags made of Bakelite polyethylene film have another and promising use. One Chicago manufacturer, Howard Parlor Furniture Co., covers each piece of new furniture with the plastic. Object: protection from scuffing and soiling during handling and truck transit. The bags also prevent discoloring. Results have been promising. Breakage of the plastic covers in transit is about 1% of units shipped, compared with 80% for conventional paper wrapping used to protect the furniture.



Centrifugal Spray process
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applied by conventional methods.
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It even helps the new Rheem high-temperature, vertical ovens do a still better curing job!

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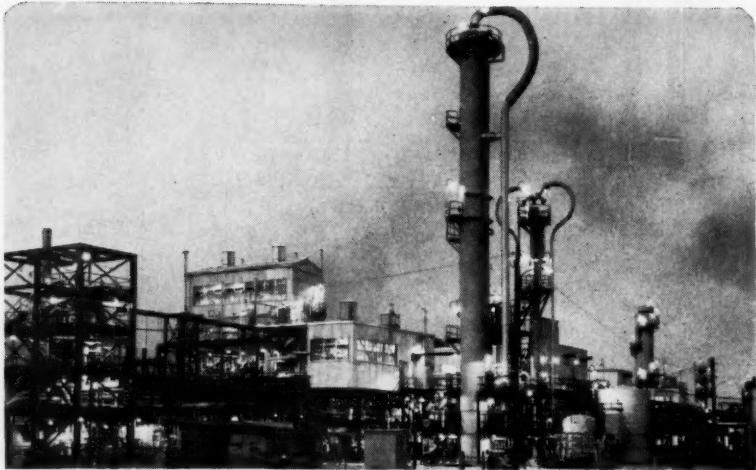
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\$1,035,000 for fiscal year 1958, enough to maintain existing programs at this year's rate, plus \$20,000 (half of the amount sought) to publish a revised edition of the National Income Supplement. This agency is staffed by professional economists, publishes detailed monthly gross national products reports, keeps tabs on a host of key economic indicators.

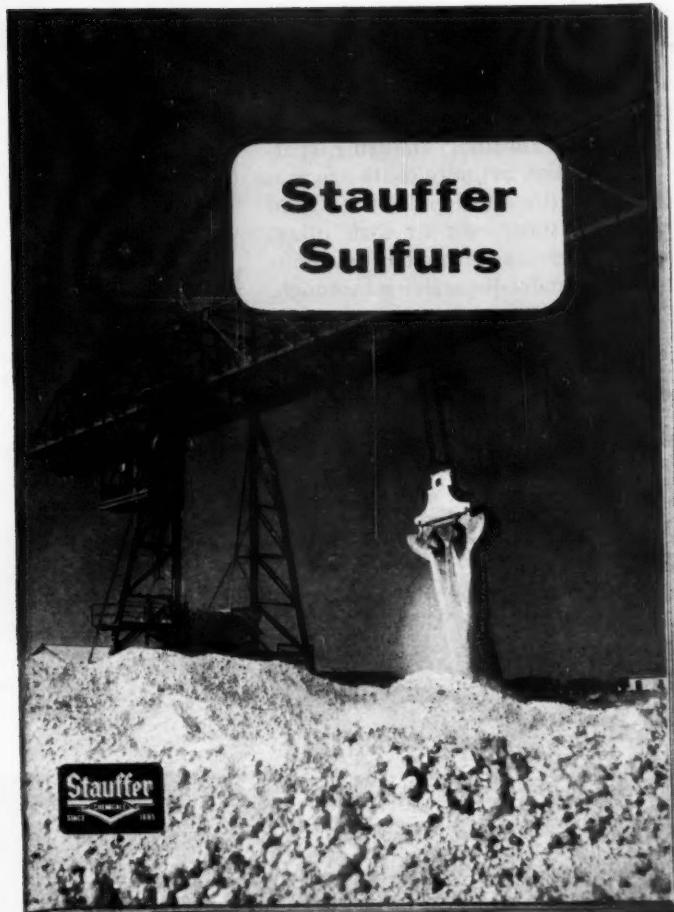
• Bureau of Foreign Commerce (Commerce Dept.): It obtained (from the House) the full \$3,060,000 requested for export control work. But some \$138,000 less than provided for the fiscal year 1957 was voted for economics programs. The House said that BFC can make economies without impairing the amount or quality of export-import statistics it publishes each month. Money allowed for this purpose: \$2,261,500.

• Bureau of Labor Statistics (Labor Dept.): The agency took a cut of about \$100,000 in the House from the \$7 million it's spending this year. But the chances are that the Senate will restore this cut and get the House to go along with additional funds of about \$220,000 for improving the accuracy of its monthly cost-of-living (consumer price) index. This money will also be used to study the effects of tariff changes on U.S. employment. On the other hand, BLS will not receive some \$600,000 sought for mandatory retirement benefits and for such new programs as wage surveys of the petroleum producing industries and other major nonmanufacturing groups.

• Census Bureau (Commerce Dept.): The House voted just enough (\$7,811,000) to maintain existing programs, denying all requests for additional funds for new projects on the agenda. Among the casualties: \$125,000 asked to improve accuracy of foreign trade statistics; \$70,000 to improve manufacturers' sales and inventory data; \$100,000 for annual publication of county business patterns; \$300,000 for collecting industry data to assess postattack bombing damage; some funds to prepare for the 1958 Census of Manufactures, Commercial and Mineral Industries. And, preparatory funds for the '58 Transportation Survey were eliminated.

• Federal Trade and Securities & Exchange commissions: These agencies won from the House the same amount they have this year for reporting

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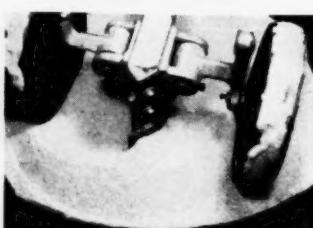
3 WAY ACTION saves time and reprocessing



after liquid addition mix is lumpy.



Going! Agglomerates start to respond to kneading, spatulate action.



Gone! Components are thoroughly blended. Mix is uniform, quickly achieved.

SALES

quarterly profits of manufacturing corporations. But, FTC was denied increases for economic study programs, including \$100,000 requested to extend the profit data to trade and mining corporations. SEC was refused \$50,000 it wants for improving its data on savings.

Gainers: Two other agencies, however, stand to fare better. The U.S. Dept. of Agriculture received a boost in marketing research funds. And the budget for the Federal Reserve Board was also upped.

Far Ahead: Over the long pull, Congress will probably recognize industry's need for more and better economic data for market research and other economic studies, despite the vulnerability of federal statistics programs to legislative budget-cutting. But, as in the past few years, aid will probably be small when measured against the needed improvement.

DATA DIGEST

- Gum arabic: Laboratory reports A-820-G2 and A-820-G3 contain information on preparation of clear solutions from various types of gum arabic; compare use of powdered and granular forms of gum solution manufacture in cases where complete filtration of the final product is part of the processing procedure; discusses how maximum clarity and freedom from natural insoluble matter may be obtained, depending on the concentration of gum solution desired. Morningstar, Nicol (New York City).

- New esters: Two bulletins describe two new products, Kesscoflex DOIS (di-2-ethylhexyl isosebacate) and Kesscoflex DBIS (di-n-butyl isosebacate), useful as plasticizer and in the formulation of synthetic lubricants. Samples are available. Kessler Chemical (Philadelphia).

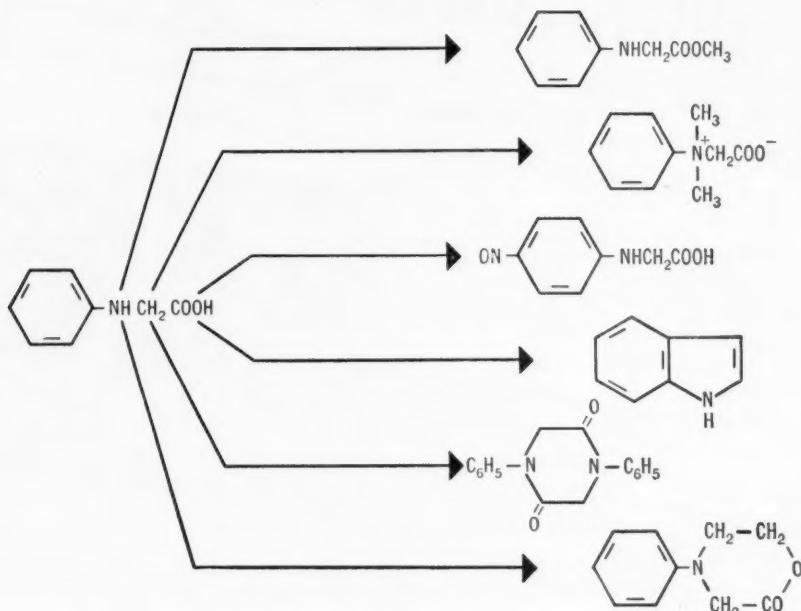
- Column partition chromatography: 16-p. booklet outlines a different mechanical approach to the problem of distributing substances across to immiscible liquid phases, the analytical technique of column partition chromatography. Merck (Rahway, N.J.).

- Acid salt: 4-p. data sheet describes a water-soluble dry acid powder, named M-629, which is a balance of acid salts, activators and surface-active agents. It's used as an activating acid dip or as a pickle for steel. MacDermid (Waterbury, Conn.).

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UREA-FORMALDEHYDE RESINS: *2-Amino-2-methyl-1-propanol (AMP)*—

Used as a stabilizer for urea or melamine formaldehyde finishes.

2-Amino-2-methyl-1, 3-propanediol (AMPD) — Used as a catalyst for making urea-formaldehyde resins.

ALKYD RESINS: *2-Amino-2-methyl-1-propanol (AMP)* — Viscosity stabilizer in alkyd finishes containing urea-formaldehyde or melamine resins.

Tris Amino — Potentially useful in manufacture of alkyd resins.

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Nitrohydroxy Compounds — As hardening agents for proteins such as casein. They are slower gelling than formaldehyde or glyoxal. *Tris Nitro* is the product most often used, although *2-Nitro-2-methyl-1-propanol* and *2-Nitro-2-methyl-1, 3-propanediol* are also effective.

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INDUSTRIAL CHEMICALS DEPARTMENT

CSC

Market Newsletter

CHEMICAL WEEK
May 25, 1957

Completion of a major pentaerythritol expansion—one of two due this year—has chemical marketers reassessing the supply/demand situation for the chemical.

Now onstream is Hercules Powder's new multimillion-dollar plant that boosts the firm's PE capacity by 24 million lbs. to a total of 50 million lbs./year. The highly integrated facilities, at Louisiana, Mo., use natural gas and steam to make methanol; the methanol is then converted into formaldehyde, the basic raw material for making PE. Hercules' new installation can produce 100 million lbs./year of formaldehyde. A unit designed to produce methanol at a 70-tons/day clip is scheduled for "subsequent completion."

Another major PE expansion—by Heyden Chemical—is nearing completion, should be onstream sometime this summer. It will pile another 25 million lbs./year on the nation's total pentaerythritol capacity.

These two expansions add up to 49 million lbs./year of new PE capacity. It's a major portion of the 63-million-lbs./year boost by '57 that *CW* predicted two years ago (*Sept. 10, '55, p. 93*). Meanwhile, other smaller expansions are nudging the total U.S. pentaerythritol capacity still closer to the predicted 140-million-lbs./year total. Reichhold, for example, has been boosting PE capacity "in slow stages"; some new capacity was added last year, more is expected late this year.

Will there be a big overcapacity of PE by the end of '57? Reminded that *CW* forecast such a likelihood, one marketer now observes, "I don't know what you want to call it, but total PE production last year was only 60-65 million lbs., and it looks as though we have right now a lot more capacity than we can use." (Tariff Commission's preliminary figure for '56 PE production: 62.3 million lbs.)

And even if most PE plants operate at only 85% efficiency—as some producers have claimed—there will still be plenty of PE around for all who want it. The question now—as in '55—is: What's to be done with the excess?

The lull in price-changing is still with us, and only a few changes—mostly on the downside—are being posted.

Almost before it stopped swinging, the $15\frac{1}{2}$ ¢/lb. tag put on lead last week was replaced by another that was $\frac{1}{2}$ ¢/lb. lower. New price of pig lead: 15¢/lb. The same fate befell the new price of lead oxides (*CW Market Newsletter, May 18*); here, too, knock off another $\frac{1}{2}$ ¢/lb.

The government, incidentally, is trying hard to scuttle reports in the trade that it was on the verge of cutting back lead and zinc purchases for the strategic stockpile. Apparently calculated to spike the

Market Newsletter

(Continued)

rumors, which have buyers staying out of the metals market waiting for still lower prices, Defense Mobilizer Gordon Gray late last week announced that the General Services Administration had been authorized by ODM to step up government purchases of lead and zinc during June.

Gray also said the order doesn't mean that government requirements have been increased—the new material will probably go into the so-called "long-term" stockpile—and this further pegs the action as strictly a market-propping move.

A whopping 30% price reduction has been handed to buyers of Bakelite's low-molecular-weight vinyl ethyl ethers. Minimum costs of truckloads or more: low-molecular-weight polymer EDBC, 40¢/lb; its heptane solution EHBC, 33½¢/lb. Previous prices were: 58¢ and 48¢/lb., respectively.

The price of silica filler is reduced more than 11% by Columbia-Southern. Hi-Sil 233, a reinforcing filler used by the rubber industry, now costs 8¢/lb. in carload quantities.

Button-popping pride can be read between the lines of Firestone's announcement this week that the world's largest synthetic rubber plant at Lake Charles, La., has now produced its one-millionth ton of synthetic rubber. The plant, which was taken over by Firestone in '55, can turn out 190,000 tons/year of synthetic rubber—90% more than the original capacity in '43.

Ethylene diamine capacity has been upped by Dow at its Texas Division; it follows a similar expansion, earlier this year, by Union Carbide (*CW Market Newsletter*, Jan. 19). Noncommittal about actual capacity, Dow spokesmen are content to describe it as "considerable," state that users of highly concentrated (92% or over) ethylene diamine will now have ample supplies.

The new unit will also produce diethylenetriamine and triethylenetetramine.

SELECTED PRICE CHANGES — WEEK ENDING MAY 20, 1957

DOWN

	Change	New Price
Folic acid, USP, bots., fib. dms., kilo-lots or more, gram	\$0.20	\$1.20
Lead, metal, pigs, prime (N. Y.)	0.005	0.15
Litharge, coml. powd., bbls., c.l., wks., frt. equald.	0.005	0.1675
Oleic acid, dbl-dist. (white), dms.	0.0075	0.19

All prices per pound unless quantity is stated.

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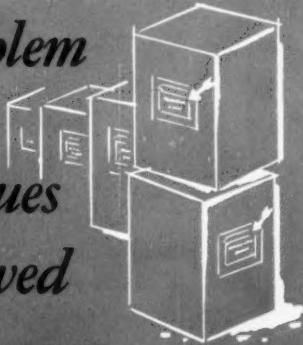
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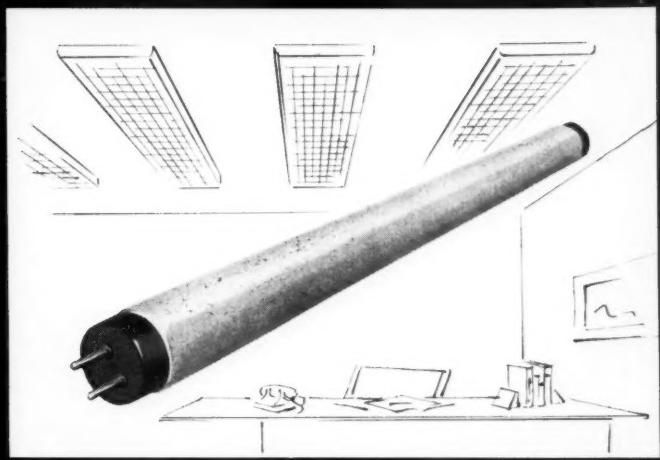
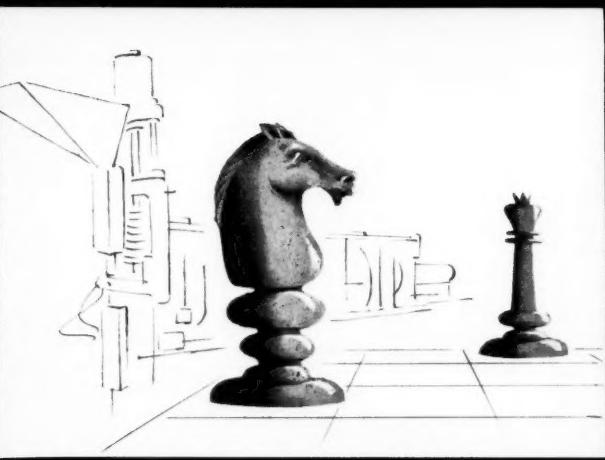
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Stearates in Plastics

Mallinckrodt stearates have many uses in industry. Zinc stearate is used as an internal and external lubricant in plastics and also as a flattening agent in lacquers. Magnesium stearate is an efficient mold-releasing agent for plastic items. Calcium stearate is a lubricant and stabilizer in plastics and also improves the plasticity of starch-clay coated papers. Gelling characteristics of aluminum stearates are important in manufacturing greases . . . and in paints they increase pigment suspension without making the paints too thick for easy application.

Chemicals for Electronics

The ability of Mallinckrodt research and production chemists to control purity and maintain uniformity of dibasic calcium phosphate and other chemicals needed to manufacture phosphors has played an important part in the development of the fluorescent lamp industry. Mallinckrodt Standard Luminescent chemicals are also used extensively in producing television phosphors. Mallinckrodt TransitAR* chemicals are used in the manufacture of transistors and other semi-conductor devices.

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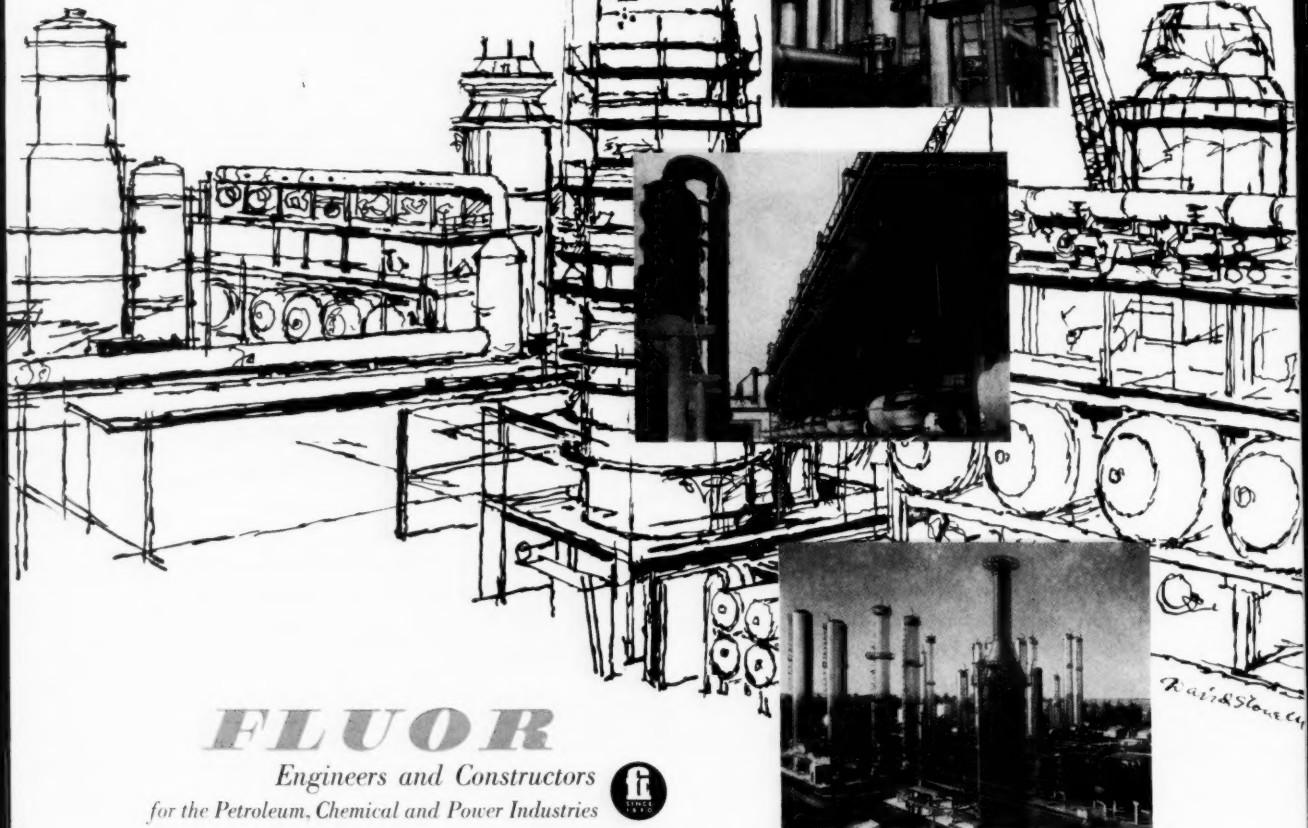
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Four years ago, The Fluor Corporation, Ltd. looked into the future...anticipating the growing need for synthetic rubber.

A challenging project was assigned to the Fluor engineering staff...the design of a new type of butadiene plant that not only processed butadiene from butane in a single step, but that produced a dual end-product of either butadiene or aviation gasoline.

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MARKETS



PHOTOS—SWING GALLOWAY
Scintillation counter and ore sample symbolize . . .

Canada's Bid for the Big Slice of Uranium Business

The boom in Canadian uranium isn't putting much gold into the pockets of U.S. chemical makers. Demand for organic solvents and ion-exchange resins will always be small, next to the demand for sulfuric acid—and there's no profit in shipping sulfuric acid from the U.S. to the Canadian North.

The bustle of Canadian activity, however, does have meaning for the U.S. uranium-refining industry, a sizable consumer of U.S. chemicals. It means that a swelling stream of low-cost uranium concentrates will be flowing into this country; it's likely that many U.S. mills will be forced to shut down after 1962 (when current contracts are satisfied), because of the availability and low cost of the Canadian material.

One of the busiest uranium areas in Canada is at remote Beaverlodge. This northern Saskatchewan district is shaping into a \$60-million/year uranium field accounting for 22% of Canada's total contract production.

Seven different companies are shipping, or are about to ship, custom ore to three concentrator mills in the area with a capacity of 4,100 tons/day (tpd.), which is expected to go to 4,600 tpd. by midsummer. Several other companies are awaiting completion of spring thaw to step up geophysical, drilling and underground exploratory work. The first units of Lorado Uranium

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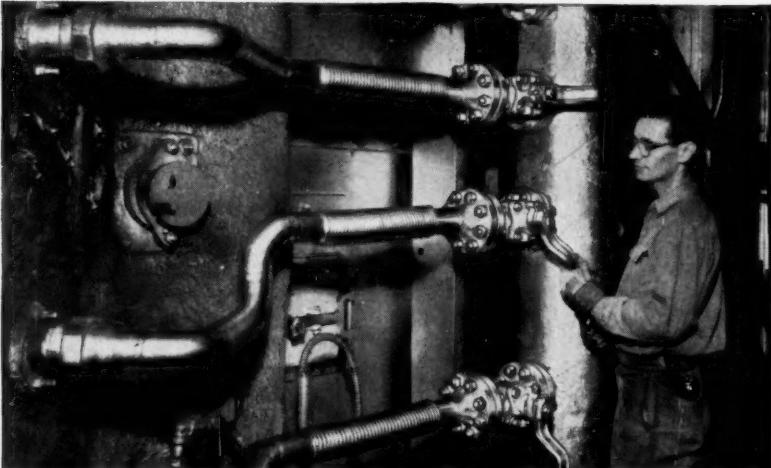
- a coupling agent and low-temperature solubilizer for heavy-duty liquids with high phosphate content
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MARKETS

Mines' custom-milling plant are swinging into operation this month, handling pyrite in grinding, crushing and flotation processes to make sulfuric acid. The first uranium precipitates will be obtained in quantity the middle of May after the leaching circuits have been filled.

The mill, with an initial capacity of 500 tpd., will, in addition to handling 100 tpd. of Lorado's own ore, treat custom feed from five other uranium mines in the vicinity of Lake Athabaska. These are Cayzor Athabaska Mines, St. Michael Uranium Mines, Lake Cinch Mines, National Explorations, and Black Bay Uranium Mines. Rated capacity is gradually to be worked up to 750 tpd.

Meanwhile, Lorado has resumed underground exploration and development on its Alco property 4 miles from the mill. Three separate ore shoots have been opened up and are expected to yield about 250,000 tons of at least 0.20% uranium oxide. Better-than-average grade is coming from the 105 ore body. A rise on this zone from the second level to the first has revealed grades better than 0.3% uranium oxide.

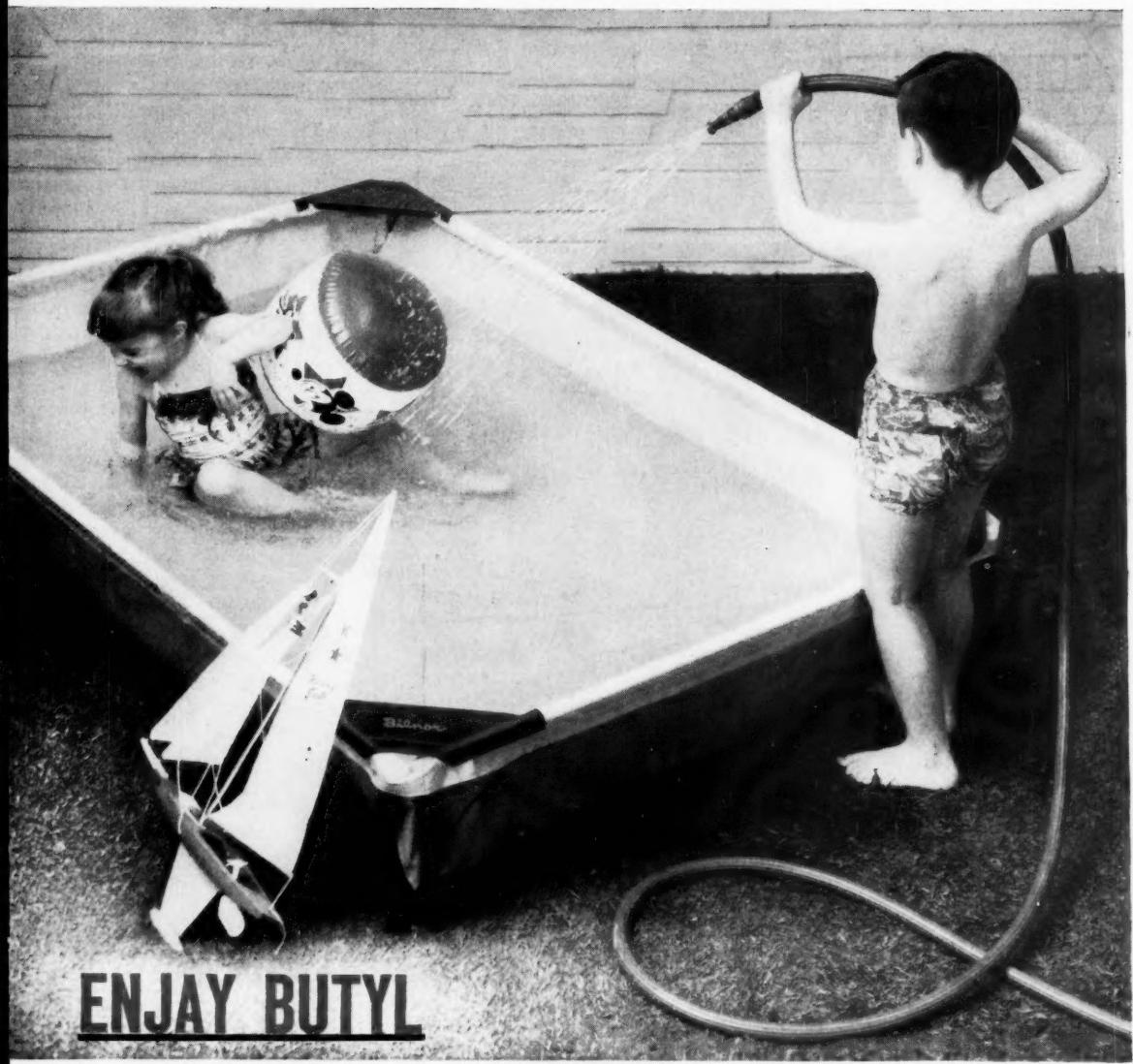
Gunnar Mines has established a new rating of 1,650 tpd., which is expected to go to 1,750 tpd. by mid-June. Its \$4-million expansion program is virtually complete.

It is expected that by next winter about 30% of Gunnar's production will come from underground mines. Operating costs (exclusive of depreciation write-offs) are down to \$12/ton, substantially below preproduction estimates.

Eldorado Mining and Refining Ltd. is boosting capacity of its concentrator from 750 tpd. to 2,000 tpd. and will take an extra 150 tpd. in custom ore. Rix-Athabaska Mines is already shipping to Eldorado, and Radiore Mines will begin this summer. Nesbitt-LaBine Uranium Mines has been shipping from its Eagle Ace mine, although actual production from this mine is now suspended. National Explorations has been shipping 50 tpd. to Eldorado but will soon switch to the Lorado mill.

Exploration from Lorado's underground workings is continuing on the property owned by Uranium Ridge Mines.

First shipments of ore from Cayzor Athabaska Mines to the Lorado mill



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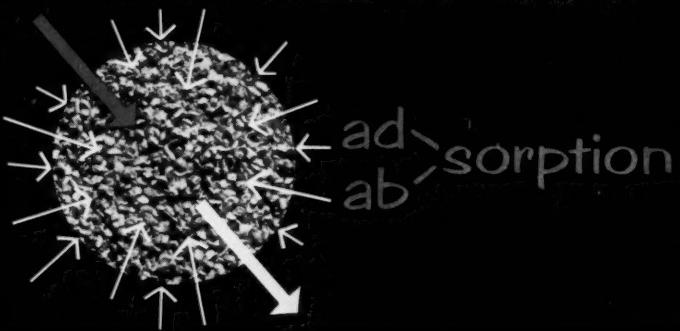
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MARKETS

are scheduled for early May. Its contract calls for delivery up to 1962 of 2,720,000 lbs. of contained uranium oxide. Grade of the shipping-mill feed is expected to average 0.33% uranium oxide, sufficiently high to allow for mine dilution. Ore reserves at the Cayzar property, 2,100 yds. distant from the town of Uranium City, are estimated at 200,000 tons as of last Dec. 31. This is conservative, since other ore-bearing zones have been indicated by surface drilling.

Lake Cinch Mines has reopened its Beaverlodge property, and an intensive program is under way to prepare the mine for production early this summer. Originally, shipments were scheduled to begin next Oct. 1; but since the Lorado mill is virtually ready, the company intends to ship at the earliest possible date.

Black Bay Uranium has collared the shaft on its newly acquired 48-claim group known as the Fishhook Bay property. Sinking of a 450-ft., 3-compartment internal shaft from the recently completed adit is scheduled for this month. The property was formerly held by Consolidated Nicholson Mines. According to Black Bay Uranium's president, F. W. Graham, 100,000 tons of ore grade have been indicated in drilling above the 250-ft. level. Diamond drilling has shown radioactivity along a length of 6,000 ft.

At the company's original Black Bay property several miles distant, ore is being stockpiled, ready for shipment to the Lorado mill along a 12-mile road that has been just completed.

Rix-Athabasca Uranium Mines grossed \$948,958 from 35,663 tons of ore grading 4.45 lbs. of uranium oxide per ton that were shipped to the Eldorado mill during '56, for a price in the mill feed of \$6/lb. For '57, in addition to tonnage currently being shipped to Eldorado, output is being increased for shipments under contract to the Lorado concentrator.

Gulch Mines is suspending underground exploration work on its Black Bay property. Earlier, during the winter, encouraging reports had been obtained from underground activity at all levels, but the ore grade at the 500-, 650- and 800-ft. levels failed to go higher than the 854 tons per vertical foot of 0.121% uranium oxide revealed by surface drilling.

In resuming shipments to the El-

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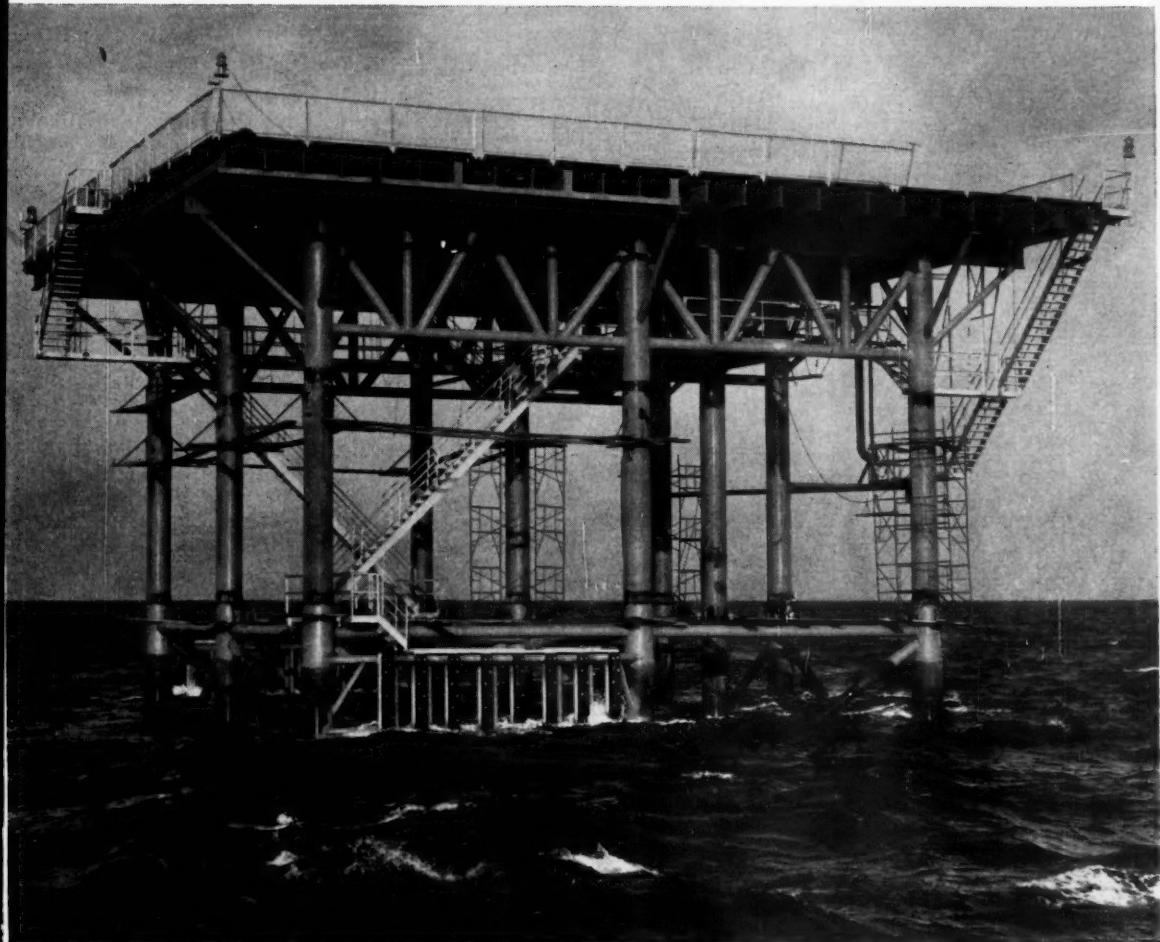


Photo: courtesy Brown & Root Inc.

Coatings based on BAKELITE Vinyl Resins for this off-shore platform of a major oil company were supplied by **Plastic Coating Corporation, Houston, Texas.**

Vinyl resin coatings prove superior for painting off-shore structures

As one coating manufacturer reports, "After extensive testing, at least 75% of the oil companies operating offshore drilling platforms are beginning to standardize on vinyl-based coatings. It is estimated that these platforms will be in the water about 50 years, so the protection of the steel is of paramount importance."

Coatings based on BAKELITE Brand Vinyl Resins have a long record of excellent performance under severe service conditions. Whether for use on metal, wood or masonry, they resist moisture, salt water and air, corrosive atmospheres, acids, alkalies, and rough usage. For names of suppliers, and a copy of our booklet, "BAKELITE Resin Coatings for the Petroleum Industry," write Dept. YE-34.

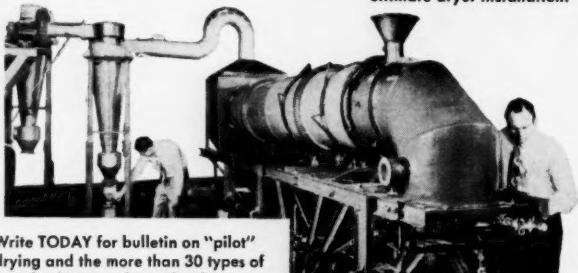
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MARKETS

dorado mill, National Explorations is drawing from 4,200 tons stockpiled at its Pat group. When the contract is fulfilled, at the rate of 50 tpd, shipments will begin to move to Laredo. The property adjoins the main Eldorado property and was reopened this month after a four-month shutdown.

Nesbitt-LaBine Uranium Mines' suspension of operations at its ABC property followed expenditure of \$1 million on underground exploration and development, none of which revealed ore measuring up to earlier drilling expectations, according to the firm's president, G. A. LaBine.

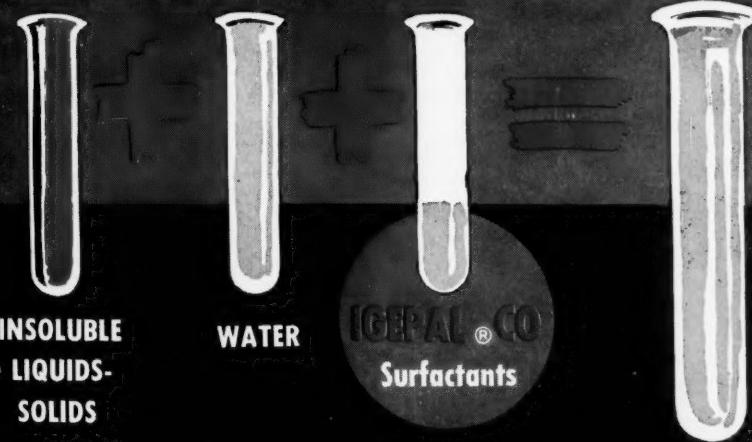
The company has announced plans for renewed exploration this summer on two uranium prospects in the St. Mary's Channel section adjoining the main property of Gunnar Mines.

Far North Explorations plans to prospect, to be followed by drilling on several Beaverlodge groups, according to Far North's president, R. A. Wallace. The company has 314 claims totalling 19,000 acres in 24 groups.

Atlas Uranium Corp., subsidiary of Ad Astra Minerals, is planning to resume drilling on its Reno and Burr uranium group, where drilling to 1,100 ft. and 11,700 ft., respectively, has already been done.

Other companies announcing plans for spring and summer activity include Baska Uranium, with a property at nearby Virginia Lake. It plans further exploration and expects to ship some ore-grade material to the Laredo mill. Abaska Mining Corp. plans further trenching and sampling on its property. Alscope Explorations has announced plans to drill a property two miles from the Eldorado mill, where 20 surface showings of pitchblende are reported. Bluegrass Uranium Mines, with six claims in the Black Bay area, found uranium oxide averages up to 1% across a 1-4-ft. show in surface trenching and for a length of 135 ft. Future work requires more funds. Athabasca Research Mining (formerly Mindalartic Mines) is also inactive at its 17-claim Milliken Lake property, where two deep holes under the lake were inconclusive.

Way to Go: Canada still has a long way to go in building up uranium refining capacity to rival that of the U.S. But the Canadian uranium rush is gathering momentum—it will bear watching.



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IGEPAL CO-430	4	44	{
IGEPAL CO-530	6	54	Emulsification, Chemical Intermediate.
IGEPAL CO-630	9-10	65	{
IGEPAL CO-710	10-11	68	Detergency, wetting, emulsification, dispersion (use temperature determines choice of product).
IGEPAL CO-730	15	75	{
IGEPAL CO-850	20	80	Stabilization of latices and emulsions. General purpose surfactants for concentrated electrolyte solutions.
IGEPAL CO-880	30	86	{

*Moles of ethylene oxide per mole of nonylphenol.

†Percent of ethylene oxide.

Further application information, literature and technical assistance on IGEPAL CO surfactants available upon request.

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From Research to Reality

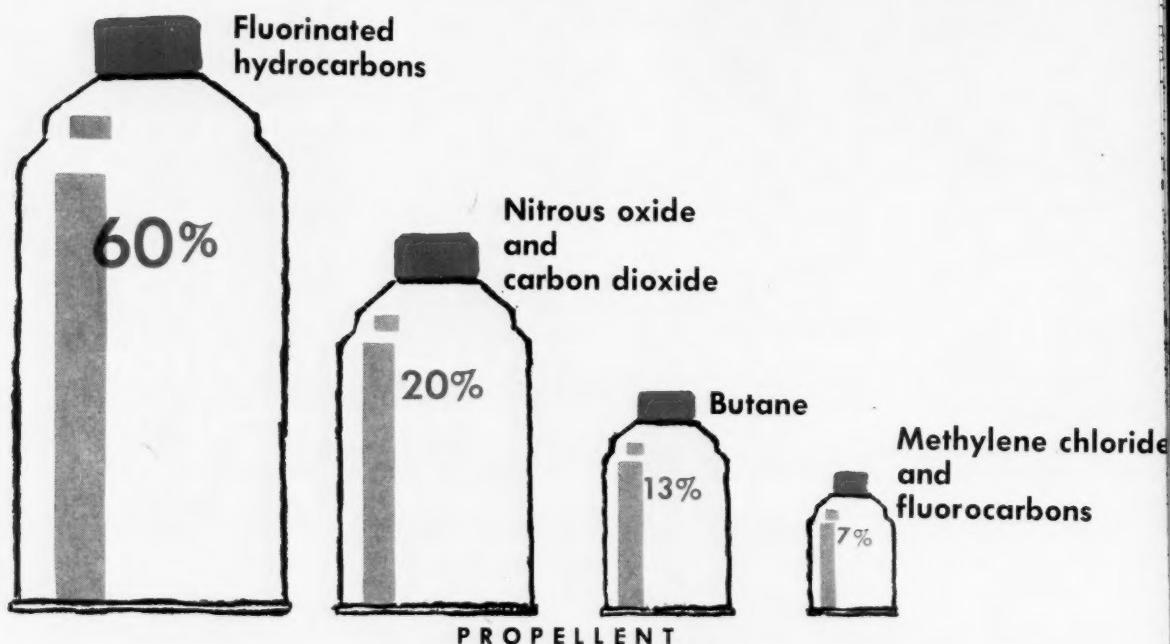
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SPECIALTIES

How Propellents Share the Aerosol Field



Approximate percentages of total units packed with various propellents.

Based on estimated 1957 production of 375 million food and nonfood units.

Butane Comes into the Propellant Picture

One of the most controversial subjects the aerosol industry has had for some years—hydrocarbon propellents—is finally out in the open. In spite of their past reluctance to discuss these potentially fire-hazardous propellents, members of the Chemical Specialties Manufacturers Assn.'s aerosol group, meeting this week in Chicago, found the subject on the official program, where it could not be blinked away.

For some, official recognition of hydrocarbon propellents (usually butane) is a welcome one, proffering the prospect of a host of new, low-cost products. For others, hydrocarbon aerosols seem to spell little but trouble.

Here, then, are the facts and the feelings about butane aerosols, gathered in an industry-wide check of fillers, formulators, consultants and suppliers.

Price and a Patent: Two factors have lifted the popularity of hydrocarbon-propelled aerosols during the

past year or so, will give them an added boost this year. These are:

- Low cost of the hydrocarbons, such as butane, isobutane and propane*, compared with that of the fluorocarbons.

- Control, largely by one firm—Carter Products, Inc.—of halogenated propellents in foam products (e.g., shave creams and shampoos).

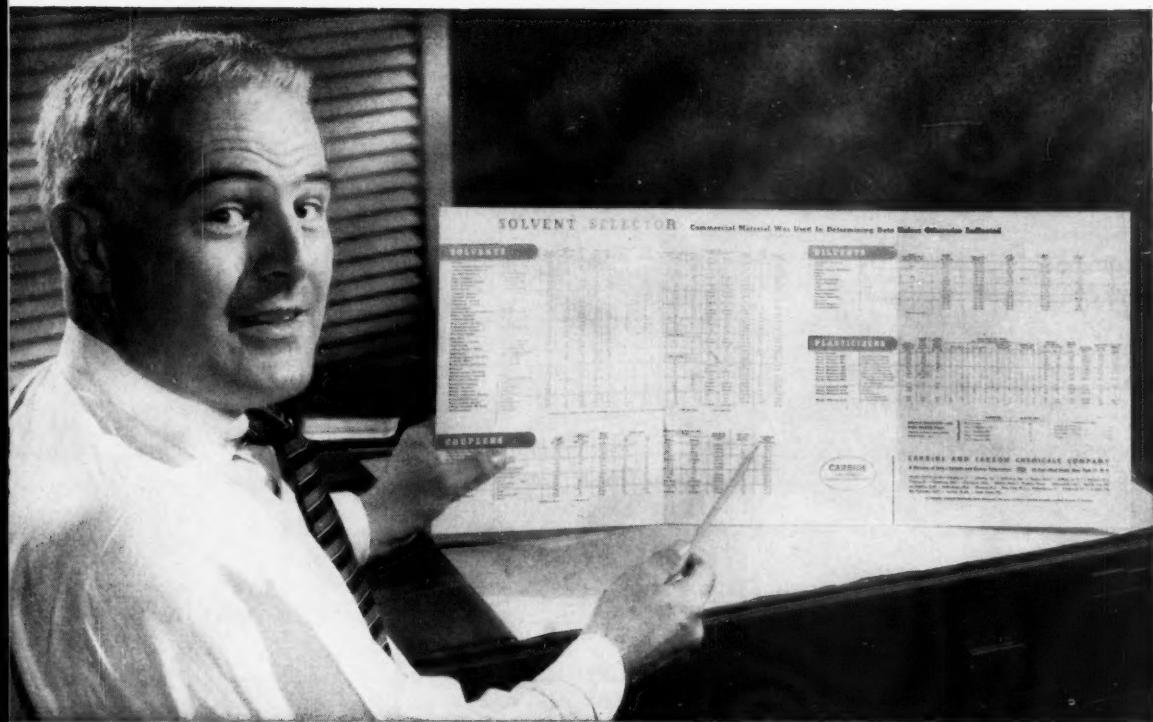
It's generally conceded that it was Carter's grip on the foam product market that turned some fillers—primarily Colgate-Palmolive—to the study of butane. They found that the gas could be handled without too much trouble, and that it offered several advantages—including cost: fluorocarbon propellant in a conventional 6-oz. can of shave cream costs about 1½¢ a unit; highest-purity butane for the same unit would cost about 0.4¢.

*These gases are supplied by many oil refiners, are part of their liquefied petroleum gas (LPG) production. Phillips Petroleum is likely the biggest supplier to the aerosol industry, since it is the only one to offer the high-purity, relatively odorless product on a major scale.

When standard-grade butane (16½¢ a gal. instead of 60¢/gal.) is used, the saving is even more marked.

With one or two exceptions (e.g., certain gasketing materials), all parts—valves, dip tubes, cans—designed for the fluorocarbons work without modification. Formulations were easily worked out with the new propellents; three-phase systems (a water-base product, liquid propellant, and gaseous propellant) in particular seemed well suited to the light hydrocarbon. And those favoring butane say it is far less likely to cause corrosion when used with water-base formulations than are the fluorinated propellents.

Safety Line: Fillers have the one substantial problem—for safety's sake, butane must be filled on an explosionproof line. Right now, only four loaders are so equipped: Colgate, Continental Filling Corp. (Danville, Ill.), Lenk Mfg. Co. (Franklin, Ky.) and Peterson Filling and Packaging Corp.



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SPECIALTIES

PROPELLENTS AND PRODUCERS

Type of Propellant	Some Major Suppliers	Approximate Bulk Costs
Fluorinated hydrocarbons (propellant "12", "11", "114", etc.)	Du Pont General Chemical Pennsalt Union Carbide (1958)	Propellents "11" and "12" 20-25¢/lb.; propellant "114" 60¢/lb.
Nitrous oxide (85%)-carbon dioxide (15%) combination	S. S. White Labs.	Patented mixture, 32¢/lb.
Butane, related hydrocarbons (LPG)	Phillips Petroleum Most refiners supply these LPG in quantity.	High purity, 12¢/lb.; standard purity, 3¢/lb.
Methylene chloride or Methylene chloride-fluorinated propellant mixes	Belle Alkali Diamond Alkali Dow Du Pont Frontier Chemical Kolker Chemical Solvay Process Division Most suppliers of the fluorocarbons will supply the mixtures.	12¢/lb. Combinations, 18-20¢/lb.

(Danville, Ill.). One other, Fluid Chemical Corp. (Newark, N.J.), is also installing a butane loading line, and hopes to have it in full operation by July.

So far, shave creams and household cleaners are the important commercially butane-filled items. Their combined sales this year should be 45-50 million units, a sizable percentage of the total 375 million food and non-food units that will likely be sold this year (*see chart*).

The shave creams and cleaners are water-based; there's hope in some quarters that water-based butane-propelled insecticide formulations (both space and residual types) will be offered soon.

Reasonable Risk? Why, with its apparent advantages, has butane won less than half a dozen major supporters? Most simply, it's the flammability hazard. Exactly what the hazard is, and how big it is, however, is still a moot point among aerosolers.

Undeniably flammable, butane must be stored in relatively expensive installations. In addition, there's the cost of the explosionproof filling line. (Pressure-filling is used on all current-

ly commercial butane-filled products, not because butane can't be cold-filled, but because the water-emulsion formulations demand it.)

Some loaders also prefer to keep hands off butane because of what they regard as dangers in the filled aerosol unit. One hazard is the possible ignition of an accumulation of leaked gas (which modern loading practices keep to a minimum). Or, there's the fire danger should a filled container be ruptured accidentally.

Both of these potential dangers, butane proponents say, seem far worse than they actually are. They feel that leakage is very small, and that whatever gas does escape is almost immediately dispersed. And because the gas percentage is low, 2-4% by weight, there is little flash hazard with a ruptured container. They also cite the successful accident-free marketing of their products over a many-month period.

So far, fire departments and groups concerned with regulation of shipping practices have not objected to the butane-filled products.

Broad Push: While butane is the most touchy subject among the cur-

rently used propellents, it is far from the only one undergoing evaluation.

The combination of nitrous oxide (85%) and carbon dioxide (15%), which finds wide use in packing whipped creams and whipped toppings, may get a boost this year, now that both Lever and Kraft have some of the low-cost toppings (made with vegetable oil) on the market. Currently, some 75-80 million of these food units are sold, with most of the gas supplied by S. S. White Laboratories (Philadelphia).

Connecticut Chemical Research Corp. (Bridgeport, Conn., now a part of the B. T. Babbitt empire) says its long-touted but seldom-seen Polysols will show up in several products this year, the lead-off items being mouthwash and depilatories. Polysols, said to encompass such exotic—and expensive—gases as argon, xenon and neon, are described by trade sources as being almost entirely carbon dioxide.

Methylene chloride, finding considerable use in place of the "114" halogenated propellents to reduce the pressure of propellant "12", also play an important part in the formulation



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SPECIALTIES

of several other products. It may well go into some 25 million aerosols this year, almost invariably in combination with one of the fluorocarbons. Leading suppliers include Allied Chemical's Solvay Process division, Dow and Du Pont, although the latter finds itself in the difficult position of offering a low-cost competitor of its Freons.

The fluorinated hydrocarbons plainly have a substantial growth potential, a fact underlined by the recent entry of a fourth producer, Union Carbide Chemicals Co., which will be in production next year. Now, Du Pont, General Chemical and Pennsalt are making deliveries.

As the old stand-bys, the fluorocarbons may be in line for their greatest boom in the field of pharmaceutical aerosols. The questions about the toxicity of the fluorocarbons to human beings have not yet been fully answered. But many aerosolists are taking a great deal of confidence from the fact that the U.S. Food and Drug Administration has not banned the sale of fluorocarbon-propelled inhalants, such as Riker Laboratories' Medi-Haler. This product, prescription-sold, squirts a metered amount of medication into the nose and throat.

It is still too early to tell just what propellents will do most to carry on the aerosol boom. Perhaps it will be the hydrocarbon propellents, perhaps hydrocarbon-halocarbon propellant mixtures, perhaps something quite different. The one thing most aerosolists are confident about is that they will find a way to keep raising their sales record (375 million units in '57). No controversy over propellant type can halt that.

PRODUCTS

Attractive Repellent: Union Carbide has come with a new packaging for its 6-12 insect repellent line. The product, long available as a stick and in bottles, is now sold as an aerosol product. The 6-oz. spray will sell for \$1.39.

Weed-Killer Paste: A paste form of the herbicide 2,4-D is now being made by Stauffer Chemical Co. It's being marketed in the North Central and Pacific Northwest states. Low volatility of the new form allows pinpoint application without damage to nearby vegetation, says Stauffer.

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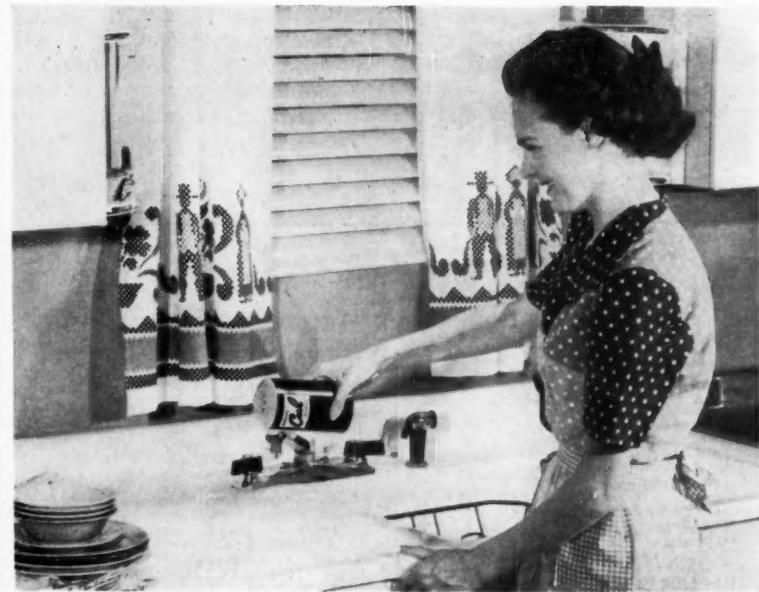
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Soft Water Sells Soap

Companies dealing in water-softening equipment have succeeded in selling the U.S. public on the advantages of soft water, but few have followed up this proselytizing as well as have two Midwest firms: Culligan Inc. (Northbrook, Ill.) and the Lindsay Co. (St. Paul, Minn.). After selling the water-conditioners, both firms go one step further—they sell their customers their own brands of soap.

Culligan Inc. has been selling soap since 1949, calls its product Cul Soap. Dollar volume has been running between \$100,000 and \$200,000/year. The soap is marketed in 6½-lb. (\$2.75) packages and an 18-lb. (\$6.50) pail for home users; it is also sold in 100-lb. drums for industrial establishments. Prices vary slightly, depending on the distance of the customer from Culligan's Illinois or San Bernadino, Calif., plants.

Softener customers usually start buying soap as a result of a short spiel they get after trying a free sample; some dealers use the 18-lb. pail as a premium when selling the water-conditioning units. In any case, the homeowner is more than likely to give the product a try. To keep a customer using the soap, he is told that "this soap is tailored for your water." The obvious implication: Who

knows more about your water than the man who services your water softener?

Softener servicemen get commissions on each soap sale—a 25¢ commission on the 6½-lb. package, up to \$1 on the 18-lb. pail.

Personal Contact: The extent of customer loyalty, the company admits, is somewhat indefinite. While most of the Cul Soap users like the product, they aren't immune to the advertising of the big detergent and soap companies. It's a matter of water-softener people constantly reselling their customers, to offset the impact of mass-media advertising.

One way the company does this is by promotion pieces that dealers stuff into service bills. Because sales volume is low (the product is limited to soft-water users), the company can't talk price. It stresses that the soap goes a long way in soft water.

Lindsay's operation is similar in many respects to Culligan's. Lindsay, however, sells soap in only one standard-size container. And, unlike Culligan, it sells its product—Lindsay's Custom Soap—to retail outlets as well as to owners of water softeners. Chain stores won't handle the product (the volume is too low), but many small stores will.

SPECIALTIES

Lindsay periodically issues coupons allowing a 5¢ saving on each package purchased. The company doesn't have an industrial product, says this would put it in competition with the soapmaker it buys from.

Only a small percentage of Lindsay's soap-selling is concentrated in retail outlets. Most is done through its franchised dealers who get the soap for \$5.25/24-box case, sell it for \$8. Lindsay's been in the soap business

about three years now, says sales has maintained a steady growth. And the future looks good, too—a company spokesman says sales of softening units are up 50% over last year, and further gains are in view.

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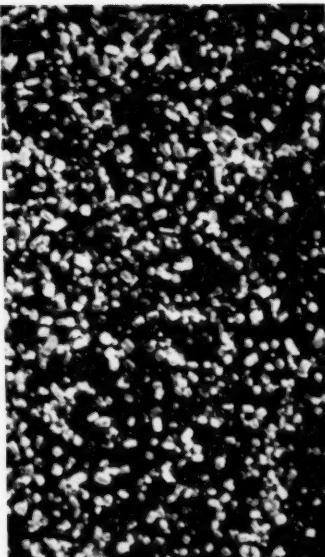
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